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MANPRINT in the LHX: MANCAP Application to the Light Infantry Division

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This effort further demonstrates the feasibility of using organizational modeling in the LHX (Light Helicopter, Experimental) program as an iterative tool to probe MANPRINT (Manpower and Personnel Integration) constraints that begin early in the system acquisition process. The effort was conducted as the second phase of a program to investigate and develop a top-down method to assess manpower, personnel, and training (MPT) for the LHX. The first phase, MANPRINT in LHX: Organizational Modeling Project, indicated that MANCAP (Manpower and Mission Capability), a top-down method of analysis that assesses MPT in terms of its contribution to mission capability, is feasible. It resulted in a prototype MANCAP model of the mission operation and attendant supply and maintenance activities for an aviation company-size unit. The purpose of the second phase is to extend the MANCAP method of analysis to a division-size organization, a Light Infantry Division (LID), thereby including the intricacies of several different units performing a variety of missions with different equipment that place simultaneous demands on a wider spectrum of the combat
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service support structure. The model was exercised using LHX RAM goals to establish a base case LHX capability for the LID. Three sensitivity analyses were also investigated. Manpower resources for each case were reviewed in comparison with those authorized in the current LID. The capability of MANCAP to translate projected LHX RAM data into mission capability for a Light Infantry Division was demonstrated. MANCAP provides a rapid and flexible tool to estimate MPT impacts on system capability during early stages of the systems acquisition process. Overall, organizational modeling using LHX RAM goals suggests that if the LHX RAM goals are achieved, maintenance manpower reductions are possible for the LHX without significantly affecting mission capability.

MANPRINT IN THE LHX: MANCAP APPLICATION TO THE LIGHT INFANTRY DIVISION

EXECUTIVE SUMMARY

Requirements:

To develop, for a division-size organization, a method of analysis that investigates the manpower, personnel, and training (MPT) impacts on a developing weapon system early in the acquisition process. The method is an extension of the method developed in the first phase of this contract research effort (i.e., the MANCAP method).

To design this method so it is flexible for adaptation to other weapon systems and able to rapidly incorporate changes in system design characteristics or operating concepts.

To apply the method of analysis to the LHX (Light Helicopter Experimental) to assess the impacts of MPT attributes on LHX mission capability.

Procedures:

The method of analysis requires inputs of operational performance profiles, operational mission timing, sequencing, duration, system RAM (reliability, availability, and maintainability) parameters, system maintenance, and sustainability assumptions in terms of personnel, materiel strength, and composition. The method of analysis is one in which the system is decomposed from an overall system operating structure to individual operating modules of the organization. This method of analysis has been titled "MANCAP" (Manpower and Mission Capability). Specifically, the method employs three separate and distinct modules: the operations and maintenance module, the supply support module, and the operator support module. Each module consists of a series of computer-based models that can be exercised concurrently or as stand-alone models.

The operations and maintenance module simulates a mission scenario to estimate mission capability and maintenance manpower requirements. The simulation model develops event information based on the anticipated mission profiles. These events are stored as string variables that serve as a "genetic code" and control the model program timing and behavior. If the required personnel resources are not available, a work order transaction is generated. As events are processed and appropriate manpower becomes available, military occupational specialties (MOS) are matched with work orders in priority. Systematic variation of

MOS availability and other parameters over successive "runs" of the simulation model are used to relate MOS present for duty to system mission capability.

The operator support and supply support modules employ the mission data obtained as outputs from the operations and maintenance module, the types of resources required, and the equipment needed to support supply operations as inputs to the models. The models use spreadsheet-type programs to determine the amount of supply or operator resources required to support the system's operating conditions. Given the total supply resources required to support sustained operating conditions and any doctrinal constraints, the numbers and types of people to continuously support the system's operational requirements are determined. Sensitivity analyses that vary the placement of support resources can be run to decrease the number or types of personnel required to maintain continuous support of the system.

Findings:

The MANCAP method provides a rapid and flexible tool to estimate MPT impacts on system capability during early stages of the systems acquisition process.

The LHX will operate, given the current system RAM characteristics and the support resources available in the current force structure.

If the RAM goals are achieved, maintenance manpower reductions are possible for the LHX without significantly affecting mission capability.

Future Applications:

Although the MANCAP method was developed specifically to address LHX MANPRINT issues, the method of analysis provides a framework for adapting MANCAP to other weapons systems. For future applications, in addition to new weapon systems, the MANCAP method might be applied to investigations of the MPT and mission capability cause and effect relationships of fielded weapon systems to quantify existing requirements or to investigate doctrinal or force structure changes.

The major advantages of this method of analysis are its speed and relatively low cost. These features make the MANCAP method extremely useful in performing "what if" analyses. The key to sustaining these advantages lies in the modular architecture and its interactive nature. The current level of development holds great promise for designing a total set of tools that will enable planners to make more efficient and effective use of manpower resources throughout the military establishment.

MANPRINT IN THE LHX: MANCAP APPLICATION TO THE LIGHT INFANTRY DIVISION

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PROBLEM OVERVIEW

Overview

The current effort was conducted as the second phase of a program to investigate and develope a top-down method to assess manpower, personnel, and training (MPT) for a developing weapon system early in the systems acquisition process. The first phase, which was completed on 16 January 1987, indicated that a top-down method of analysis that assessed MPT in terms of its contribution to mission capability was feasible (Robinson, Lindquist, March, & Pence, in preparation). Specifically, the first phase resulted in a prototype model of the mission operation and attendant supply and maintenance activities of a company-size unit. The objective of the second phase was to extend the method developed in the first phase to a division-size organization thereby including the intricacies of the interaction of several different units performing a variety of missions with different equipment which placed simultaneous demands on a wider spectrum of the combat service support structure.

The Light Helicopter Experimental (LHX) weapon system was used as the prototype for the effort. As such, the method developed utilizes computer-based models to estimate the mission capability of the Combat Aviation Brigade of the Light Infantry Division equipped with LHX aircraft performing a specific set of missions over a sustained period. The functions modeled were the mission scenario; aircraft maintenance; repair parts supply; petroleum, oils, and lubricants (POL) supply; and ammunition supply.

The key characteristic of the method developed is its ability to estimate the mission capability attainable with a specific set of human resources for a developing weapon system. Additionally, the method developed employs interactive computer models that are capable of rapidly and cost effectively incorporating changes in system characteristics and data as they occur throughout the systems acquisition process.

The method of analysis is one in which the system under investigation is decomposed from an overall system operating structure to individual operating modules of the organization. The modular treatment of the system provides a flexible framework to incorporate changes because individual modules can be modified or deleted with little or no modification to the overall model structure. Modularity also enables relatively easy expansion to include other organizations, additional parameters, or additional human performance estimation methods. This method of analysis, to include the computer-based models, has been titled MANCAP (Manpower and Mission Capability).

Problem Definition

To accurately estimate the manpower, personnel, and training impacts on a developing system requires a method of analysis that produces outputs with a high degree of fidelity. Therefore, it must be able to address system specific requirements. The integration of the LHX into the method development process provided the ability to determine if the method being developed produced the level of fidelity desired. Although the development of the method was designed specifically to address aspects of MANPRINT[1] for the LHX, the method of analysis is generic and provides a framework for the integration of materiel and human resources.

The models produced provide the means to estimate the manpower required in a multi-level organization to sustain a desired operational capability. Additionally, the detailed manpower requirements produced for each organizational level provide the ability to infer the personnel and training impacts in the context of the operating scenarios. The method assesses the sustainability based upon the system and workload availability of the resources needed to support the mission.

MANCAP Application to the LHX

The MANCAP method of analysis, as applied to the LHX, provides the manpower and support requirements to tactically employ the LHX in the Light Infantry Division. This includes operator, maintainer and support personnel insofar as they have a direct role in the operation of the system or provide combat service support to the system. The method also identifies possible MPT alternatives that enhance mission capability.

MANCAP does not address routine operational, administrative, and support functions that are not altered by the presence of the LHX. For example, food service is not addressed because the LHX does not drive a change in the size, assignment, attachment, or functions of the mess teams.

Report Organization

This report is organized into five sections and five appendices. The second section, entitled Method, contains a description of the MANCAP method of analysis as it was developed

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[1] The MANPRINT (Manpower and Personnel Integration) initiative requires early intervention in the life cycle of a system to assure that manpower, personnel, training, human factors engineering, system safety and health hazards can influence system design if required.

for the LHX. The third section, entitled MANCAP Application to LHX, contains a description of the application of the method developed in the second section to the LHX. A presentation of the results of the application is contained in the fourth section, LHX Results and Sensitivity Analyses. The fifth section, entitled Conclusions, presents a discussion of potential, future applications of the MANCAP method. The final section also presents conclusions made by the research team with regard to the process and application of the method.

METHOD

Overview

Specific LHX MPT issues provided the framework to ensure the development of a method that was useful in estimating MPT requirements of a developing weapon system early in the acquisition process. As such, the method of development was an interactive process between MANCAP method development and LHX MANCAP application. The fidelity of the data desired for the LHX required the model to be detailed and system specific. Throughout the development of the LHX specific model, care was taken to ensure the design of a generic analysis tool that could be applied to other weapon systems.

The approach that resulted in the MANCAP method of analysis consists of a series of four major steps:

1. System definition.
2. Identification of system operating scenario.
3. Functional Description.
4. Development of computer-based models.

To thoroughly define the system to be modeled, it is necessary to describe its major components. These include the weapon system under investigation, the organizations employing the weapon system, and the support activities associated with the system. Step 2 consists of selecting operating scenarios for the system organizations. During the third step, applicable chains of events of system operation and the associated resources are identified. The fourth step is the aggregation of possible operations to include operating scenario, supply and maintenance operations, and system assumptions into computer-based models.

System Definition

The first step in defining the major components of the system is to identify the essential elements of information required for each component. The essential elements of information are those data elements that when combined provide the necessary information to achieve the goals of the research.

The essential elements of information are drawn from the MPT attributes of the weapon system concepts. The initiation of the operational sequence in the context of the operating scenario acts as the catalyst for the interactions of those attributes. The outputs of the MANCAP model are the quantification of those interactions. Once analyzed and aggregated, the outputs become the essential elements of information. Therefore, the system attributes must be identified in detail to include key resources available in or consumed by each system component. In order to ensure a model that is flexible, the attributes are classified as assumptions or rules depending upon their variability.

An assumption is defined to be an element of the model that is fixed. That is, the assumptions are built into the model structure and can not be changed without major modifications to the model structure. The research team attempted to limit the number of assumptions in order to maintain flexibility and a top-down modeling approach thereby ensuring the ability to incorporate additional information of the emerging weapon system as it is made available. Furthermore, as much as possible, designation of assumptions was limited to those attributes that are basic functions of a generic system and thus would not detract from the application of the method of analysis to other weapon systems.

Rules, as used in this effort, are modeling parameters that are specific to the system to be modeled but can be adapted for different types of systems and can be changed without major modifications to the model. Rules can be categorized as either semi-fixed or interactive parameters. Semi-fixed parameters may require additional programming to modify but can be changed relatively easily for the system as updated when information becomes available. Semi-fixed parameters include the work priorities of maintenance personnel, the location at which the system is to be repaired, and the number of people required to perform a single maintenance or supply action. The interactive model parameters are those rules that are able to be modified easily without additional programming such as the time required to transport the weapon system from one level of repair to another. These parameters are based upon design goals and serve primarily as model inputs. A complete list of the LHX system attributes used in this effort are included in Appendix A.

System Operating Scenario

For each system to be modeled, an operating scenario must be identified. This consists of the identification of the number of the weapon systems operating per mission, the mission duration, the number of missions per operating cycle, the cycle length, and the mission intervals. The data produced by the operating scenario are interactive parameters to the model and, as such, can be changed without modification to the model structure.

Functional Description

During this step, the major components of the system are integrated. The overall sequence of operations are identified as well as the possible paths of operation accessible from the primary operating sequence. For example, for the prototype effort the LHX mission sequence served as the primary path of operation. Maintenance and supply operating sequences associated with the mission sequence were also identified for each organization because the essential elements of information desired for the LHX included the impact of maintenance and supply operations on LHX mission capability. However, for other weapon systems, different operating paths may be identified based on the essential elements of information required for that particular system. The possible paths may be at different organizational levels where interactions with other systems occur and must also be identified. Figure 1 illustrates a characteristic operating structure for a developing weapon system.

The key resources are also associated with the appropriate level of the operating structure during this step. Resources included the numbers and types of personnel required, supply requirements, and other combat service support required to operate, maintain, and support the weapon system. Resource constraints are identified during this step to ensure that system operability is not achieved at the expense of resources not actually available or that are allocated for other existing systems. Many of the resources and resource constraints are categorized as interactive parameters and may be adjusted to perform sensitivity analyses.

Model Development

The development of the model was an iterative process driven by the types of information required for the LHX, and the request for a flexible and generic method of analysis. To satisfy the requirements described above, the model developed was a combination of three modules, illustrated in Figure 2, consisting of an operations and maintenance module, a supply support module, and an operator support module that are mission profile dependent.

Operations and Maintenance Module

Computer simulations that are used to model the performance of complex systems rely on the interactions among the components of the system to generate or "duplicate" the behavior of the system. The basic interactions among system components are expressed mathematically. For the simulation developed, the interactions between weapon system operations and manpower required for maintaining, operating, and supplying the system provided the basic interactions for the simulation.

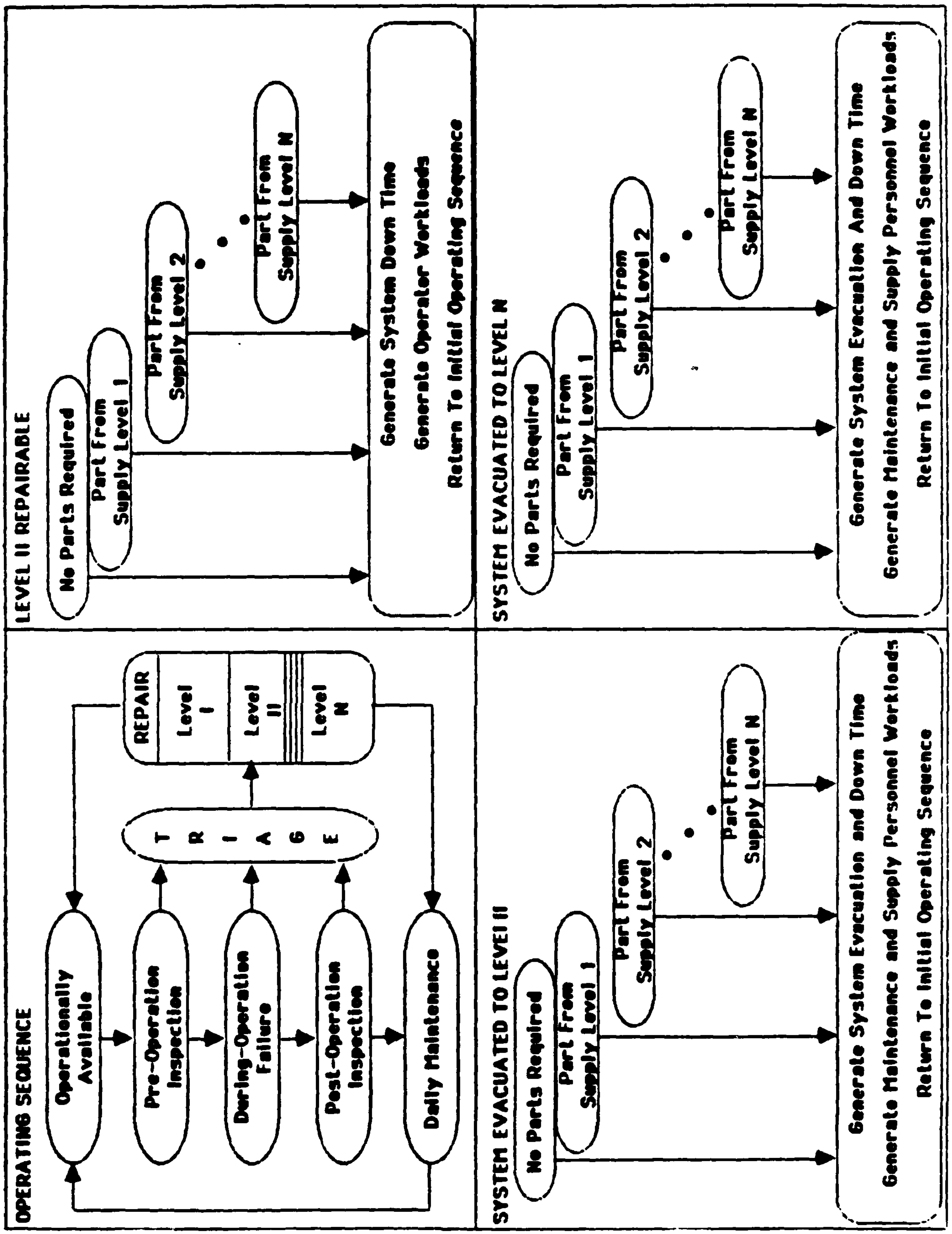


Figure 1. General system operating structure.

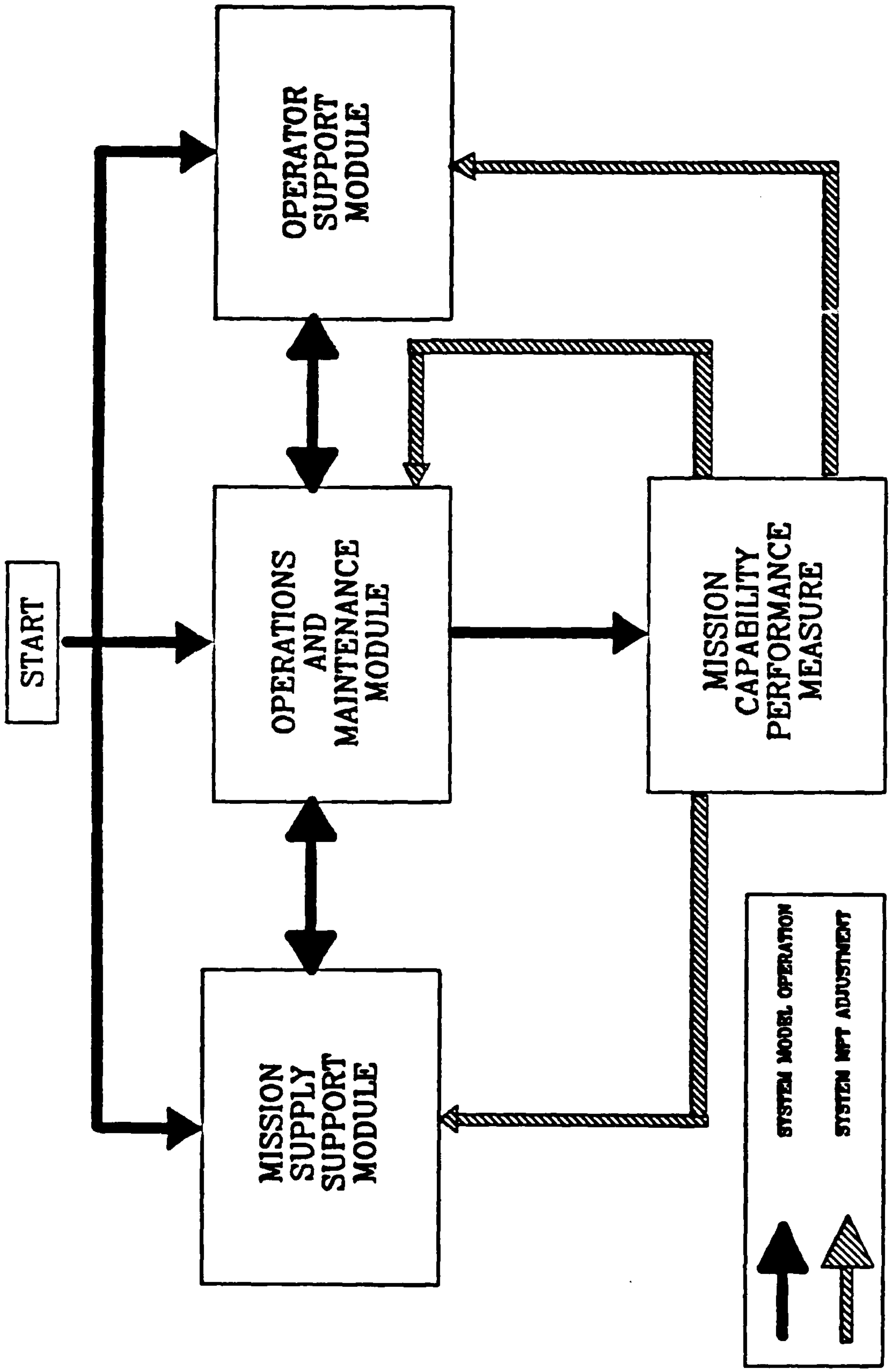


Figure 2. MANCAP overview.

Traditional closed system analyses that employ expected value calculations were not employed due to the complexity of the system to be modeled. A complex system that relies solely on expected value calculations is subject to large deviations from actual system performance due to the aggregation of expected values without regard to the possible deviations that each expected value may possess. Although the LHX is a complex system, the modularity of the method allows for less complex systems to be modeled with the degree of fidelity appropriate for the essential elements of information required.

The simulation model developed for this research effort is based on the Monte Carlo method of sampling to estimate a desired result. In the model, the total system was expressed in terms of events which are points in time where characteristics of the system change. For example, the start of an operating cycle, a change in work shifts, or the requirement to perform a maintenance action were all considered events. A time or a probability was associated with each event. The times and the probabilities associated with events are determined from the system RAM (reliability, availability and maintainability) characteristics. Since the times and probabilities were interactive parameters to the simulation, they can be readily changed when new system data becomes available or to perform sensitivity analyses.

The execution of the simulation is achieved through a progression from one event to an immediately succeeding event. At each event, records are updated to reflect any changes in the measure of system performance. The progression of event outcomes is achieved through random sampling for probabilities using a Bernoulli Trial. If the random number drawn is greater than the probability associated with the activity, then the activity did not occur and the "No" path of operation is taken. However, when estimating an expected failure during weapon system operation (pre-flight, in-flight, or post-flight for the LHX), failures are distributed exponentially across the duration of the mission. An exponential distribution is used as the sampling distribution because it is the standard for queuing theory problems.

The first operating cycle generates the first set of events such as mission start, mission completion, mission failure, or maintenance action required. These events, in turn, generate manpower requirements which then create future events. The manpower events are linked to the weapon system events through the means of a "tub file". A "tub file" is created for each distinct group of personnel at each organizational level. As a personnel requirement is generated, it is prioritized and a record is placed in the "tub file". As personnel become available, they remove work from the tub file in priority sequence. The simulation process continues through as many operating cycles as desired with the system performance status being updated at each event. If practical, the process should be repeated for as many cycles as needed to achieve a "steady state"

condition. However, steady state is dependent on the initial conditions of the system and its design parameters and, in some cases, may require an unaccountable number of cycles. Figure 3 is a simplified illustration of the overall simulation model process. The detailed flow diagrams are provided in Appendix B.

Operations and Maintenance Module Outputs

The outputs of the simulation model are the status of the weapon system or personnel as determined by the simulation over its cycle length. The data provided are based on the average value of "n" replications over the length of the operating cycle. Outputs can be expressed by the average number of events generated, the average time spent in each event, the average number of operating sequences started, the average number of operating sequences computed, the manpower required to operate the system, or the average amount of supply and maintenance workload resulting from the operating cycle.

Supply Support Module

The supply module provides a method to estimate the supply manpower and personnel required to support a given operating scenario for an emerging weapon system. The method can be applied to different types of supply operations to include repair parts, fuel resupply, and ammunition resupply for different mission scenarios or different weapon systems.

The model developed employs a spreadsheet program that makes extensive use of the data that is provided as outputs of the simulation model discussed above. Specifically, the operating scenario, the average mission duration, the average number of missions per day, supply resources required, resource consumption rates, system capacity, and doctrine support requirements are inputs to the model. It is not mandatory that the inputs come from the operations and maintenance module. If desired, the supply support module can be run in a stand-alone mode.

Upon input of the resources required, the equipment required to support supply operations, and mission data, the model determines the amount of supply resources required to support the system's operating conditions. Given the total supply resources required to support sustained operating conditions, the numbers and types of people to continuously support the system's operational requirement are then determined.

Supply Support Module Outputs

The supply support module provides an estimate of the resources required to support a given operating scenario as well as the manpower and equipment required to manage the resources.

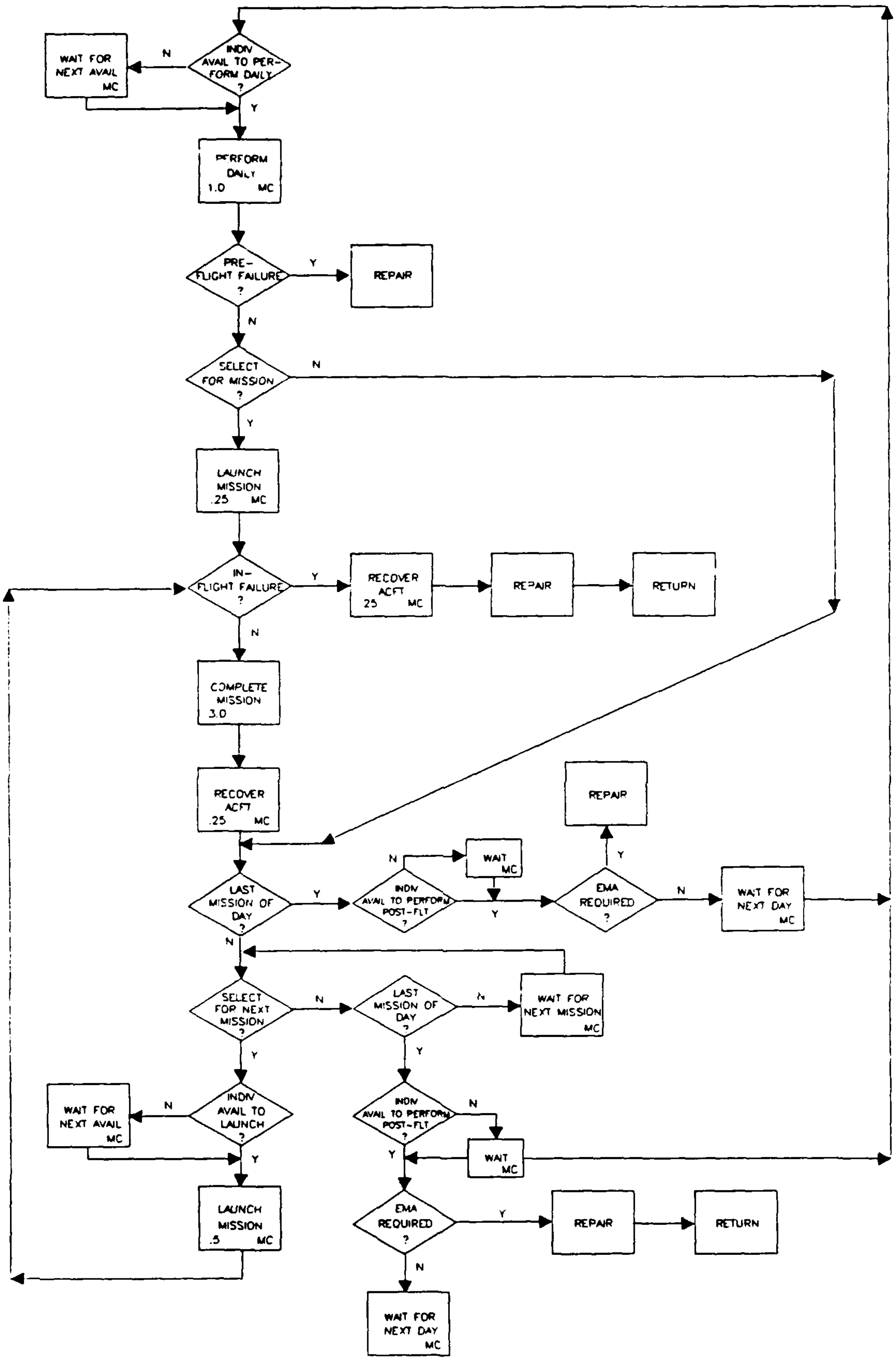


Figure 3. Operating sequence flow diagram.

The outputs can be used to evaluate the effect of supply requirements on mission availability and duration determined by the operations and maintenance module. Moreover, the sensitivity analyses can be used to determine the positioning of equipment and personnel to most efficiently perform supply operations.

Operator Support Module

The operator support module works similarly to the supply support module in that it is a spreadsheet-type model where the inputs are interactive model parameters consisting of average mission durations, number of operations required per day, number of systems engaged in operations, and the doctrinal requirements. The mission duration and frequency of missions are then translated into an operator mission requirement. Given doctrinal constraints such as work limitations and number of operators required per system, the model then determines the number of operators required to support a given operating scenario.

Operator Support Module Outputs

The output of this module can take a variety of forms such as the number of operators required to continuously support a specific operating scenario, or the number of system operations that can be supported by a given number of operators. Regardless of the form of the operator support module output, the information provides the ability to determine the effects of operator requirements on mission capability and the effect of system operations on manpower requirements for operator personnel.

Contribution of MANCAP Method to MANPRINT Program

The method of analysis complements the ARI MANPRINT program by providing a relatively inexpensive yet precise method to quantify and study the relationships between hardware design, manpower availability, personnel capability, and mission capability. The input information required to employ the method is minimal and can be changed interactively to include system RAM data and a mission operating scenario.

The rapid and flexible approach of the MANCAP method allows for a rapid and inexpensive "what-if" capability that is useful for MPT planning during early materiel systems acquisition or during doctrinal development. This "what-if" capability is provided through the ability to interactively perform sensitivity analysis for some or all of the modules discussed above. The "what-if" analysis can be performed by changing the interactive parameters of each module such as the number and types of personnel available at various levels of maintenance to investigate their impact on mission capability.

The MANCAP method is relatively inexpensive since it was developed using a modular approach which allows for the application of one or several modules. The modules can operate together or in a stand-alone mode which is useful when the information desired is only dependent on one of the modules.

Moreover, the MANCAP method is beneficial to the MANPRINT program since it allows for the incorporation of new RAM data, the modeling of different operating scenarios, and the modeling of varying personnel authorizations. The MANCAP method's low cost and flexibility is important to the MANPRINT program since the MANPRINT program's purpose is to incorporate the integration of manpower and personnel early in the system development process, but integration at an early stage also requires the flexibility to change as the system becomes better defined.

MANCAP APPLICATION TO THE LHX

Application of the previously described MANCAP method to the LHX was done concurrently with and was an integral part of the method of analysis. The Light Infantry Division (LID) was chosen as the organization investigated because it is scheduled to employ LHX aircraft almost exclusively. Moreover, the LID is the smallest and most mobile division receiving LHX aircraft and therefore has the most austere support structure. Although the method was applied to LHX assets in the LID, the method can easily be applied to the other division types. The nature of the top-down approach employed was such that at times the information available drove the structure of the model and at other stages the demands of the model established the requirement for specific elements of data. The method of analysis was applied to the LHX operating under three mission scenarios to determine the relationships among hardware design (RAM), manpower requirements, and mission capability. Application of the methodology to the LHX required completing the following four steps as discussed in the Method section.

1. LHX system definition.
2. Identify LHX mission scenario.
3. Functional description.
4. Apply computer-based models to the LHX system.

LHX System Definition

The first step in applying the methodology is to describe the total system in sufficient detail to effectively investigate the MPT impacts of introducing the LHX into that system. In the LID the organizations materially affected are the Combat Aviation Brigade (CAB) and the Division Support Command (DISCOM). Therefore, the system may be described as the interaction of the activities within those organizations occasioned by and in support of combat and combat support aviation mission functions.

The major elements in the system are the:

1. Weapon system.
2. Operating organizations.
3. Support activities.

The weapon systems are the LHX SCAT (scout/attack) and Utility aircraft. The aspects of the LHX that cause interaction among the elements of the system are the crew complement, failure rates, repair times, and support equipment. The specific attributes that affect MPT were drawn from the body of design goals and concepts that have been specified in the various acquisition documents. A further description of the model attributes is contained in Appendix A to include a discussion of all assumptions, semi-fixed parameters, and interactive parameters as described in the Method section.

The operating organizations are the aviation section in the Headquarters and Headquarters Company (HHC) of the CAB, the Air Reconnaissance Troops (ARTs) of the Air Reconnaissance Squadron (ARS), and the Attack Helicopter Companies (AHCs) of the Attack Helicopter Battalion (AHB). Figure 4 depicts those organizations with their key resources to include organic support capabilities. Operators (pilots) within these organizations are limited by the crew endurance constraints established in AR 95-1 and repairers are limited to 3.4 hours of direct maintenance and 2.5 hours of indirect maintenance per 12-hour shift as stipulated in the LHX RAM Rationale Report. The strengths and military occupational specialties (MOS) are in accordance with the L-series Table of Organization and Equipment (TOE).

The support organizations are organized to operate in accordance with the Two Level Maintenance Concept, the standard multitiered Class IX supply system, and current ammunition and petroleum, oils and lubricants (POL) resupply doctrine prescribed in FM 1-104. These organizations are the shaded organizations in Figure 4 and include the Headquarters and Service Company (HSC) of the AHB, the Headquarters and Headquarters Troop (HHT) of the ARS, the Class III and V Supply Platoon of the HHC CAB, and the DISCOM's Aviation Maintenance Company (AMC) and Supply and Transportation Battalion (S&T BN) with its FSCs (Forward Supply Companies). The maintenance personnel have the same general workload capabilities as those in the operating organizations. However, the aviation trades (68 Series MOS), avionics MOS, and technical inspectors (66 Series MOS) are virtually exclusive to the support organizations. The Class IX personnel are capable of processing 37.41 and 12.05 requisitions per day in CAB and DISCOM, respectively (see Appendix C for the derivation of the Class IX capability). The ammunition and POL handlers in the Class III and V Supply Platoon are only limited by a 12-hour shift and the doctrinal and equipment constraints existing within a FARP (Forward Arming and Refueling Point), and the ammunition handlers in the S&T BN are capable of handling 275 tons per day in accordance with MACRIT (Manpower Authorization Criteria).

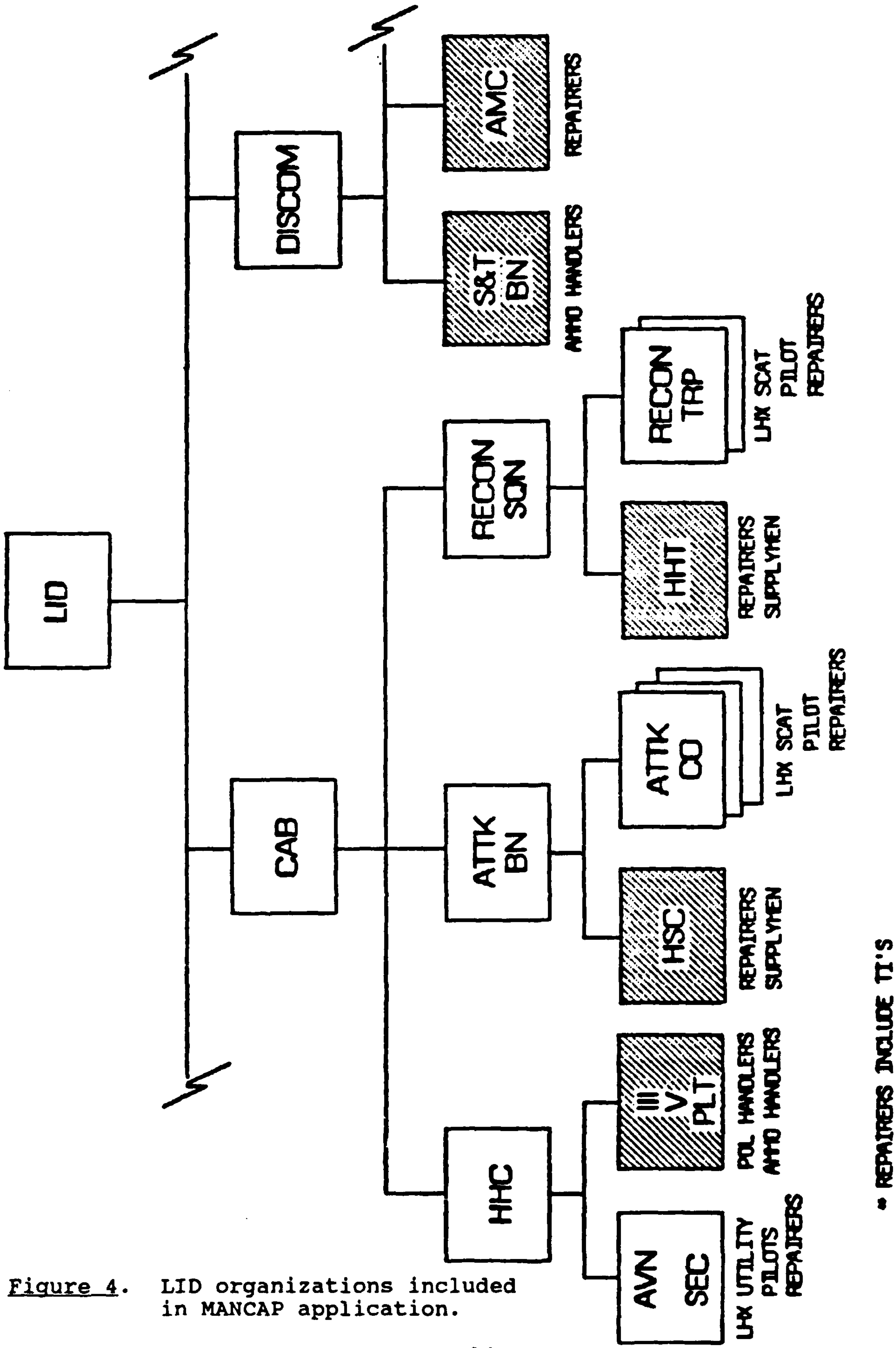


Figure 4. LID organizations included in MANCAP application.

LHX Operating Scenario

A mission scenario that placed a representative demand on the system was developed for each type unit. The missions are independent except insofar as they place simultaneous demands on portions of the support system. The mission scenarios were taken from the mission profiles in the LHX RAM Rationale Report developed for the Combat Developers Analysis. The attack mission profile consists of two 3-hour missions performed back-to-back with eight aircraft each. The reconnaissance mission scenario consists of two missions, one with five aircraft, the other with two aircraft, with the second mission launch occurring 1.8 hours after the first mission launch. For both missions, the mission duration is three hours. There was no utility mission scenario given in the LHX RAM Rationale Report. Consequently, on the basis of the Logistics Support Analysis (LSA) sheet, the research team developed a utility mission consisting of a series of continuous three ship, three hour missions. Figure 5 illustrates the different mission scenarios for the AHB, the ART, and the HHC CAB used in the modeling effort.

Functional Description

The operating structure for the mission scenarios described above is highly dependent upon the structure of the LID. For the aircraft system modeled, the sequence of operations consisted of a mission performance sequence for each aircraft in each mission scenario and the possible actions or series of actions that may occur from performance of that mission sequence. The mission performance sequence consists of a daily inspection, selection for mission, mission launch, mission recovery, and a post-flight operation. The possible paths that an aircraft may follow given the mission performance sequence consists of a series of repair actions that result from a mission failure or required maintenance action. Repair actions can be performed on the flight line, at the headquarters level, at AMC, or through substitution of float aircraft. Figure 6 is a flow diagram illustrating the basic operations that may occur for any LHX aircraft in the LID. Appendix B contains a detailed description of the flow diagrams representing the aircraft sequence of operations with all possible paths of action depicted in detail.

In addition to the aircraft sequence of operations, a flow diagram was developed to depict the possible paths of action that maintenance personnel may take. The diagrams for maintenance personnel, also presented in Appendix B, differ according to MOS and organizational location. For example, the LHX repairer, MOS 67(2), is the only repairer located on the flight line and only performs daily inspections, launches, recoveries, post-flight inspections, aircraft transfers to higher maintenance, or flight line repairs. The technical inspector only performs inspections of repairs performed at the headquarters level or AMC. He does not perform any actual hands-on maintenance. All other repairer

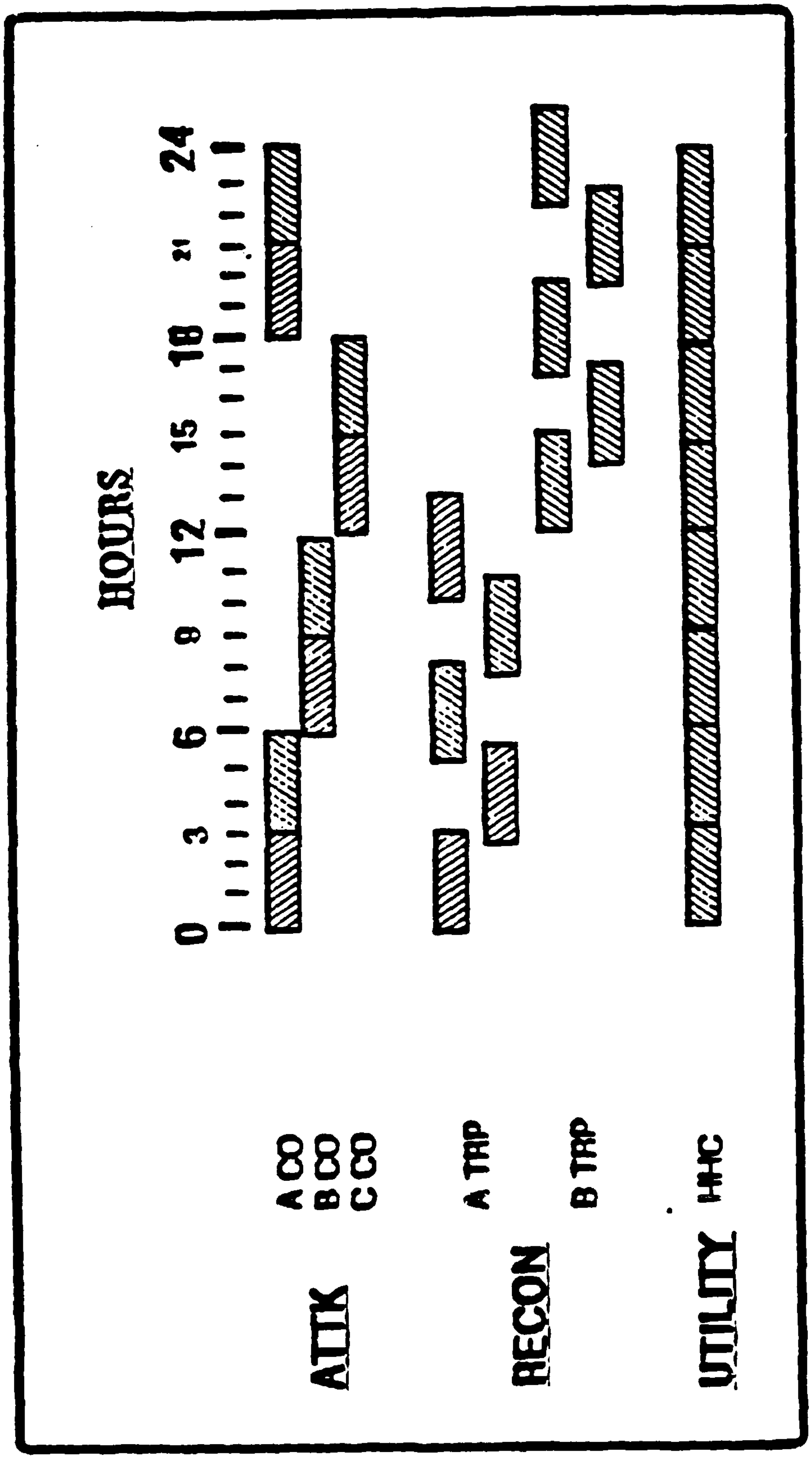


Figure 5. LHX mission profiles.

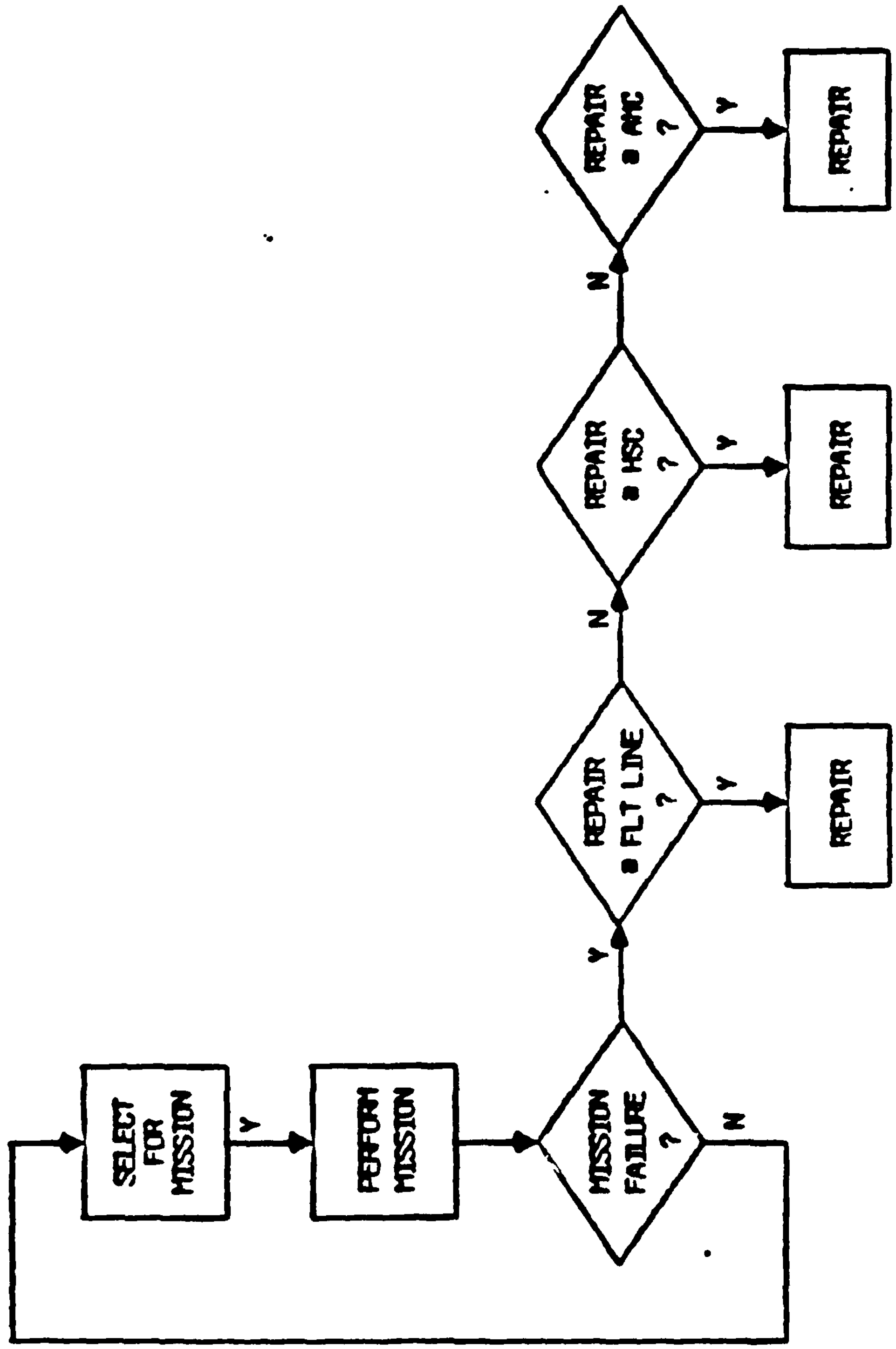


Figure 6. Simulation flow diagram of LHX operations.

MOSs perform repairs at the headquarters level and AMC. Maintenance personnel operate from a "tub file" where all of their work orders are stored. The "tub-file" operates as a work order management system. When an individual begins his shift, he checks the "tub file" for the highest work priority and executes that maintenance action. Until his work shift is over or until the individual has exceeded the allotted time to perform direct maintenance, the individual continues the process of getting the highest priority work order from his "tub file", and performing aircraft maintenance. The probabilities and elapsed times of the actions represented in the flow diagrams were also identified during this step. The repair and supply location probabilities and times were taken directly from the Administrative Logistics Down Time (ALDT) model in the LHX RAM Rationale Report. The maintenance workload was distributed among the repairer MOS according to probabilities derived from MARC factors provided by the LHX Program Manager's Office.

Table 1 presents the numbers and types of operator, maintainer, and supply MOS authorized for in the Army of Excellence (AOE) TOE.

Table 1

LHX Personnel Authorized in AOE TOE

PERSONNEL TYPE/MOS	AHC AOE	HSC AOE	ART AOE	HHT AOE	HHC AOE	AMC AOE	FSC AOE
AVIATOR	18	N/A	11	N/A	6	N/A	N/A
REPAIRERS							
66J	0	1	0	1	0	1	
66(1)	0	7	0	5	1	8	
67(2)	11	15	10	10	6	37	
68(3)	0	4	0	2	0	11	
68(4)	0	9	0	8	0	12	
68G	0	3	0	2	0	4	
68H	0	0	0	0	0	3	
68K	0	1	0	1	0	1	
35(5)	0	9	0	3	0	15	
55B	0	0	0	0	25	0	8
76 SERIES	0	4	0	4	0	8	0
77F	0	0	0	0	42	0	0

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 2 displays the probabilities associated with the latest MARC factors for the repairer MOS authorized to support the LHX used in the modeling effort. The numbers and types of personnel authorized were determined from a review of the existing Light Infantry Division's AOE TOE. From a review of FM 1-104 and the LHX Full Scale Development (FSD) Request for Proposal (RFP), supply constraints identified included the constraint that rearming and refueling operations will require a minimum of two personnel. Other supply constraints are based on the design characteristics such as the types and amount of ammunition, the fuel capacity, and the fuel consumption requirements for the LHX.

Table 2

Probability of Repair

MOS	LHX (UTIL) MMH/FH	LHX (SCAT) MMH/FH
66J	Inspects all repairs performed by 68(4)	
66(1)	Inspects all other repairs	
67(2)	.042	.098
68(3)	.240	.166
68(4)	.224	.332
68G	.135	.104
68H	.045	.031
68K	.090	.072
35(5)	.224	.197

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Application of MANCAP Modules to LHX

The data developed for the LHX were incorporated into the operations and maintenance module, the operator support module, and the supply support module as they were being developed. The data served as inputs for the various modules but also served as a baseline from which the modules were structured to ensure that the modules were sensitive to various mission profiles and MPT parameters.

Application of the Operations and Maintenance Module

The operations and maintenance module consists of a simulation routine that exercises the LHX according to the previously described mission scenarios, capability constraints, and priorities established by the input data.

The input data are entered and adjusted interactively to include the mission profile, the number of cycles or subcycles, the number of missions per cycle, the mission length, the numbers of aircraft per mission, the number of units per cycle, and assorted RAM data. The RAM data that are input into the model are the Mean Time Between Mission Affecting Failure (MTBMAF), Mean Time To Repair (MTTR), and Mean Time Between Essential Maintenance Actions (MTBEMA).

The simulation begins by selecting aircraft to perform a mission, sequencing through the mission flow diagram and generating events as the aircraft progresses through the sequence of operations. Each aircraft has a string variable associated with it that contains an aircraft and unit identification code, a time, an aircraft status code, and maintenance action codes, when appropriate. The string variables serve as a "genetic code" for each event transaction that occurs.

When maintenance transactions are generated, the simulation determines, based upon random sampling from probability distributions and previously generated events, which MOS is required, if the needed MOS is available, and the type of repair required. If the MOS or part is not available, the aircraft is placed in a queue, and a wait time is generated for the aircraft until the MOS or part becomes available. Wait times are recorded.

The simulation progresses from one event to an immediately succeeding one for as many cycles as have been specified in the input data. For the attack mission profile, four cycles of 18 hours each were used to obtain mission performance data for a period of three days. The utility and the reconnaissance mission profiles simulated aircraft performance for three cycles of 24-hour periods for a total performance period of three days.

The research team found that differences in aircraft availability and average flying hours between scenarios of three and six days were minor and appeared to be due to differences in the random numbers used in the simulation process. Therefore, a three-day scenario provides approximately the same precision as a six-day scenario. A three-day performance period was thus determined to be sufficient to achieve a steady state for the mission scenarios.

The simulation model was initially run for 12 replications in order to generate outputs that were normally distributed and could be averaged to obtain repeatable output data. Initially,

12 replications did not appear to generate sufficient maintenance workload for the ART and HHC CAB, so additional replications were added to those simulation runs. However, an analysis of the data from runs with increased replications revealed little difference in the amount of maintenance workload generated. Therefore, it was decided that 12 replications generated sufficient maintenance workload for all three of the organizations simulated.

Application of the Supply Support Module

The supply support module was applied to each of the mission profiles for Class III, V, and IX supply. For each unit type, supply operations are conducted at the headquarters level and in the DISCOM. The supply workload generated in the DISCOM takes into account the aggregated supply requirements of the three unit types. In all cases, the supply workload is generated based upon the supply required to sustain the level of mission operations determined in the operations and maintenance module.

Class IX Supply. Class IX supply is provided to the division units through the Prescribed Load List (PLL) at the owning unit and through the Authorized Stockage List (ASL) located in the DISCOM's AMC. The PLLs for the AHB, ARS, and HHC CAB are maintained at the HSC, HHT, and HHC CAB, respectively.

The Class IX module employs the MACRIT workloads rates expressed in requisitions processed per day. The module computes manpower based on requisitions processed during the durations and maintenance simulation divided by the MACRIT. Since the PLL and shop stock are operated on a "use one order one" basis, each time a repair requires a part, a requisition was submitted. The workload at the PLL and shop stock levels was determined on the basis of the repairs requiring parts performed at the owning unit (HHC CAB, AHB or ARS). For the ASL, the workload was based on the total requisitions processed within the division.

The MACRIT unit of work is a line of supply. Therefore, prior to performing the above calculations, it was necessary to convert lines to requisitions per day. The method of conversion is described in Appendix C.

Class III Supply. Class III supply is provided to the AHB, the ART, and the HHC CAB by the HHC CAB Class III and V Platoon. FM 1-104 states that when determining the fuel requirements for a unit, assume 100% aircraft availability. Therefore, determination of fuel requirements for the LHX is not dependent on aircraft availability. Fuel requirements are dependent upon average mission duration, number of aircraft per mission, and fuel consumption rates. FM 1-104 also states that refueling operations require one person to operate the pump and another to operate the nozzle. Since aircraft launches occur simultaneously and missions occur back-to-back, each unit requires two Class III supply personnel per aircraft launched at a given time.

Division level Class III supply support is provided by the Class III Section of the Forward Supply Company (FSC) of the Supply and Transportation Battalion (S&T BN). However, the total Class III requirements for the CAB exceed the storage capacity (24,000 gallons) of the S&T BN. Therefore, for the purposes of this effort, the Class III and V Platoon is assumed to perform organic resupply from non-divisional sources.

Since the Forward Arming and Refueling Points (FARPs) are responsible for fuel resupply to LHX units, a spreadsheet model was developed to investigate the personnel and equipment requirements of a FARP based upon the fuel requirements of the LHX. The types of equipment and personnel authorized for FARP operations were determined from the AOE TOE of the Class III and V Platoon in the HHC CAB. There are 42 aircraft fuel handlers authorized in the Class III and V platoon, allowing for two men to conduct refueling operations, one operating the pump and the other operating the nozzle.

The types and numbers of equipment authorized in the Class III Section of the S&T BN are as follows:

- 16 - HEMTTs (heavy expanded mobility tactical trucks) with mounted tank and pump units
- 16 - 600 gallon tanks with 1.5 two-wheeled trailers
- 10 - FAREs (forward area refueling equipment)
- 30 - 500 gallon collapsible fuel drums

It is assumed that each HEMTT has 1 pump unit with 4 nozzles and each FARE has 1 pump with 2 nozzles. However, the model can be changed easily to include additional equipment or personnel.

To determine the LHX fuel requirements at a given FARP location, the fuel consumption per mission was determined as well as the required replenishment capability. The replenishment capacity is the amount of fuel that must be in the system in addition to the fuel at the FARP in order to sustain refueling operations.

The consumption of fuel for a given mission was determined by the average flying hours, as determined in the operations and maintenance module, the number of aircraft per mission and a consumption rate of 430 pounds per hour (66.98 gallons per hour). The replenishment capacity was determined from the travel times to and from the FARP which were determined from Table 4-4 in FM 1-104 and the amount of fuel supplied per mission period.

For the purposes of this analysis, it was assumed that the 500 gallon drums would be airlifted for resupply and thus would not require FARP personnel to resupply. Due to the requirement of back-to-back missions, refueling operations had to be accomplished simultaneously for all mission aircraft. Therefore, there was a requirement to have as many nozzles available as there are aircraft to refuel.

The total mix of personnel and equipment required was then determined interactively from the amount of equipment and personnel required to refuel the selected mission and resupply the FARP. The placement of equipment and numbers of personnel can be varied to determine the refueling capabilities of the FARP given various combinations of equipment and different operating scenarios. Figure 7 illustrates one possible FARP structure used to refuel an LHX equipped unit.

Class V Supply. Class V supply is provided by the Class III and V Platoon of the HHC CAB for units organic to the CAB and by the Ammunition Transfer Point (ATP) Section of the FSC, S&T BN in the DISCOM. The Class V supply requirements of the CAB were determined similarly to the Class III requirements discussed above. FM 1-104 and the LHX Draft FSD RFP (2nd draft) specify that rearming operations require two personnel per aircraft and 100% aircraft availability for staffing purposes. Given these doctrinal constraints, the ammunition requirements for the LHX were based upon the number of aircraft per mission, the number of missions per day, and the ammunition requirements for the LHX aircraft. For the purposes of this analysis, it was assumed that every mission would require a full load of ammunition. Thus, when staffing for ammunition resupply, it was assumed that all aircraft to be launched would be resupplied.

The LHX Class V supply requirements of the LID were determined based upon the number of personnel authorized for the ATP Section and the workload generated by the operations and maintenance module. The AOE TOE authorizes 8 people (MOS 55B) each with a handling capacity of 275 tons of ammunition daily.

The ammunition requirements of the LHX were input into the model to include the number and types of ammunition required. From the LHX Draft FSD RFP, it was determined that the SCAT is to be equipped with four Hellfires weighing 44.5 kg, 8 air-to-air missiles weighing 12.7 kg, and a magazine capacity of 500 rounds per mission. The weight of the rounds was determined from FM 101-10-1 and was determined to be .34 kg. The Utility is equipped with the same armament system as the SCAT except that it is not equipped with any Hellfire missiles. The LHX ammunition requirements were determined by the model based upon the LHX ammunition capacity in terms of weight and the frequency of resupply.

The ammunition requirements were then aggregated for the three unit types to determine the total portion of the ATP Section required to support LHX units in the CAB. Specifically, the Class V supply requirements were determined as:

$$\frac{[(\text{ammo/mssn})*(\text{mission/day})*(\text{acft/mission})]}{\text{workload}} = \text{ATP section personnel required}$$

EQUIPMENT	NUMBER ALLOCATED	CAPACITY (GALLONS)	TOTAL CAPACITY	NO. OF NOZZLES	NO. OF PUMPS	TOTAL NOZZLES	MANPOWER REQUIRED	MISSION	AVERAGE FLYING HR	ACFT/ MSSN	CONSUMP/ MSSN	RND-TRP TRAVEL
								ATTACK	2.66	8.00	1425.33	4.43
HEMMT	16.00	2500.00	40000.00	4.00	1.00	64.00	80.00					
TANK UNIT TRAILERMOUNTED	16.00	600.00	9600.00	0.00	0.00	0.00	0.00					
FARE	10.00			2 00	1.00	20.00	30.00					
COLLAPSIBLE DRUM	30.00	500.00	15000.00	0.00	0.00	0.00	0.00					
			64600.00				110.00					

EQUIPMENT	NUMBER SELECTED	FUEL CAPACITY	PERSONNEL REQUIRED	NOZZLES AVAIL	ACFT REFL	FUEL REQ REMAINING	REPL CAP	NUMBER SELECTED	FUEL CAPACITY	PERSONNEL REQ/UNIT	TOTAL PER REQ	FUEL REQ REMAINING
					8.42	74.67	2373.77		2500.00		1.00	126.23
HEMMT	0.00	0.00	0.00	0.00				1.00	2500.00	1.00	1.00	
TANK UNIT TRAILERMOUNTED	0.00	0.00	0.00	0.00				0.00	0.00	0.00	0.00	
FARE	4.00	0.00	12.00	8.00				0.00	0.00	1.00	0.00	
COLLAPSIBLE DRUM	3.00	1500.00	0.00	0.00				0.00	0.00	0.00	0.00	
		1500.00	12.00									

TOTAL MANPOWER REQUIRED	=	13.00
TOTAL EQUIP REQUIRED HEMMT	=	1.00
TANK UNIT TRAILERMOUNTED	=	0.00
FARE	=	4.00
COLLAPSIBLE DRUM	=	3.00

Figure 7. Possible FARP organization.

Application of the Operator Support Module

The operator support module requires inputs of aircraft availability, average mission duration and environmental factor to determine the maximum number of flying hours per operator per day and the number of mission flown per day. The environmental factor is based upon the crew endurance requirements specified in AR 95-1. In the model developed, the environmental factor used was a combination of day and night flying requirements assuming seven day mission sustainability. This factor can be changed interactively if actual mission conditions are known. The model then determined the number of pilots required to operate the LHX and sustain mission performance for the three mission profiles.

Sensitivity Analyses

The three modules of the MANCAP method were first applied to each of the mission profiles assuming the availability of the authorized maintenance personnel as specified in the LHX RAM Rationale Report. These initial applications served as baselines from which sensitivity analyses were run to investigate potential personnel reductions and their impact on LHX mission capability. The specific sensitivity analyses performed are discussed in detail along with the initial outputs of the base case in the next section of this report.

LHX RESULTS AND SENSITIVITY ANALYSES

This section presents the results of the application of the MANCAP method to the LHX. The results are first presented for each of the three mission scenarios with the quantity and types of personnel authorized by the LID AOE TOE to the LHX. The first set of results provided the base case from which various sensitivity analyses were performed. The sensitivity performed for each mission scenario was a reduction of maintenance personnel available at the headquarters level. Two additional sensitivity analyses were performed for the AHB which included an investigation of the mission capability impact when there is a reduction in the number of aircraft in each AHC and when there is a decomposition of the AMC. The last two sensitivities were performed only for the AHB since it is the most demanding mission profile in terms of maintenance manpower required. The base case and the sensitivity analyses results are presented in Appendix D.

Base Case Results

The base case presents the mission capability and resources required to support the LHX given the manpower and support resources currently available in the LID. Figures 8 through 11 illustrate the mission capability profile for the attack, the utility, and the reconnaissance missions.

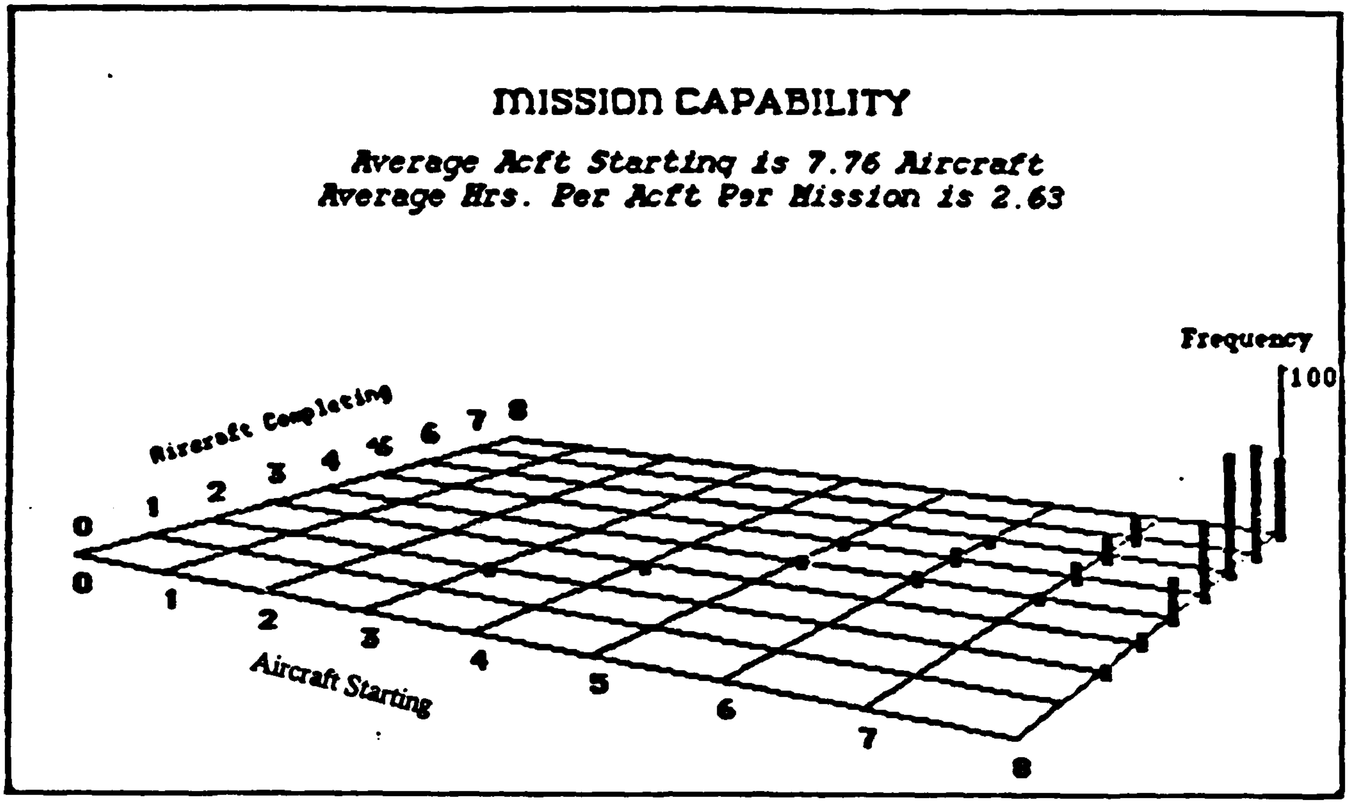


Figure 8. Base Case Mission Capability Profile-Attack(AHB)

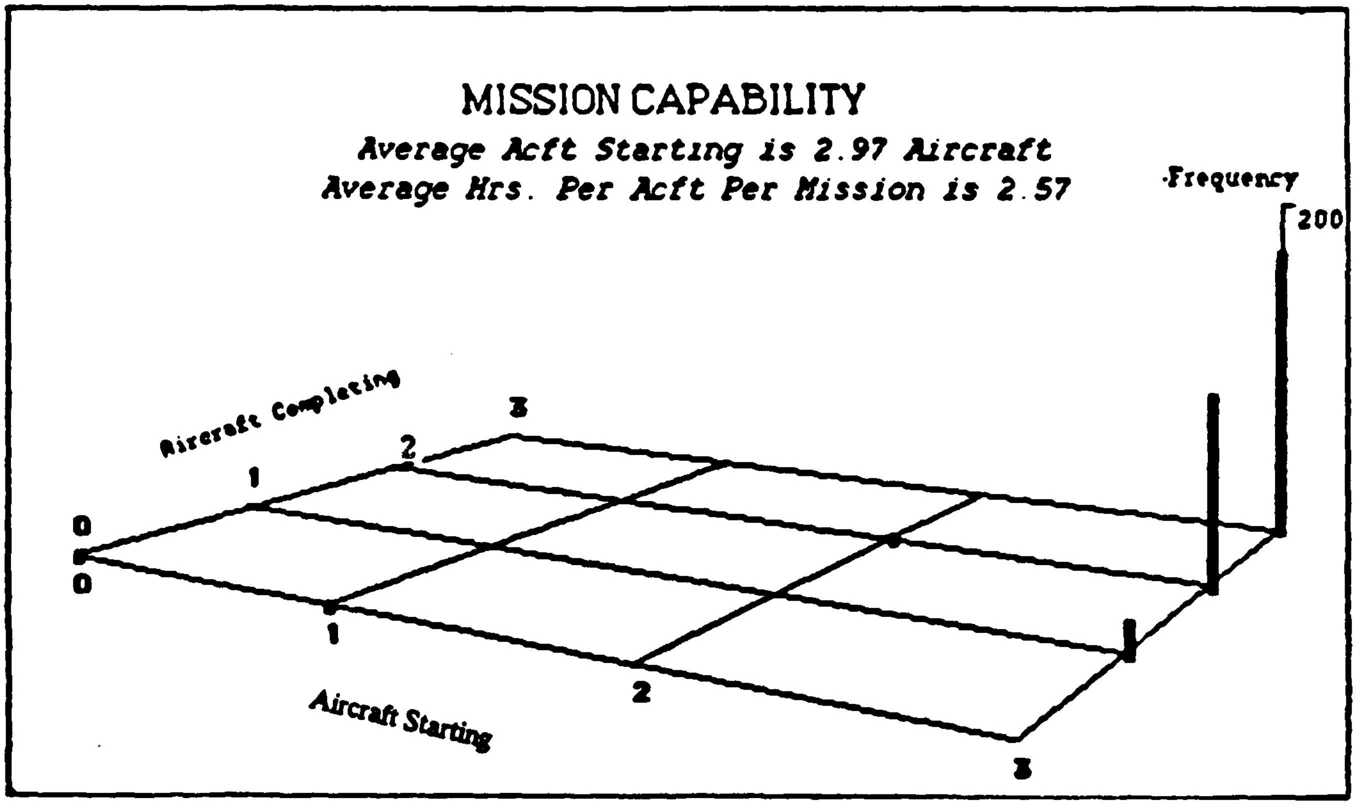


Figure 9. Base Case Mission Capability Profile-Utility (HHC, CAB)

Aircraft Starting	=	The number of aircraft able to start the mission.
Aircraft Completing	=	The number of aircraft performing an entire 3 hr. mission.
Frequency	=	The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

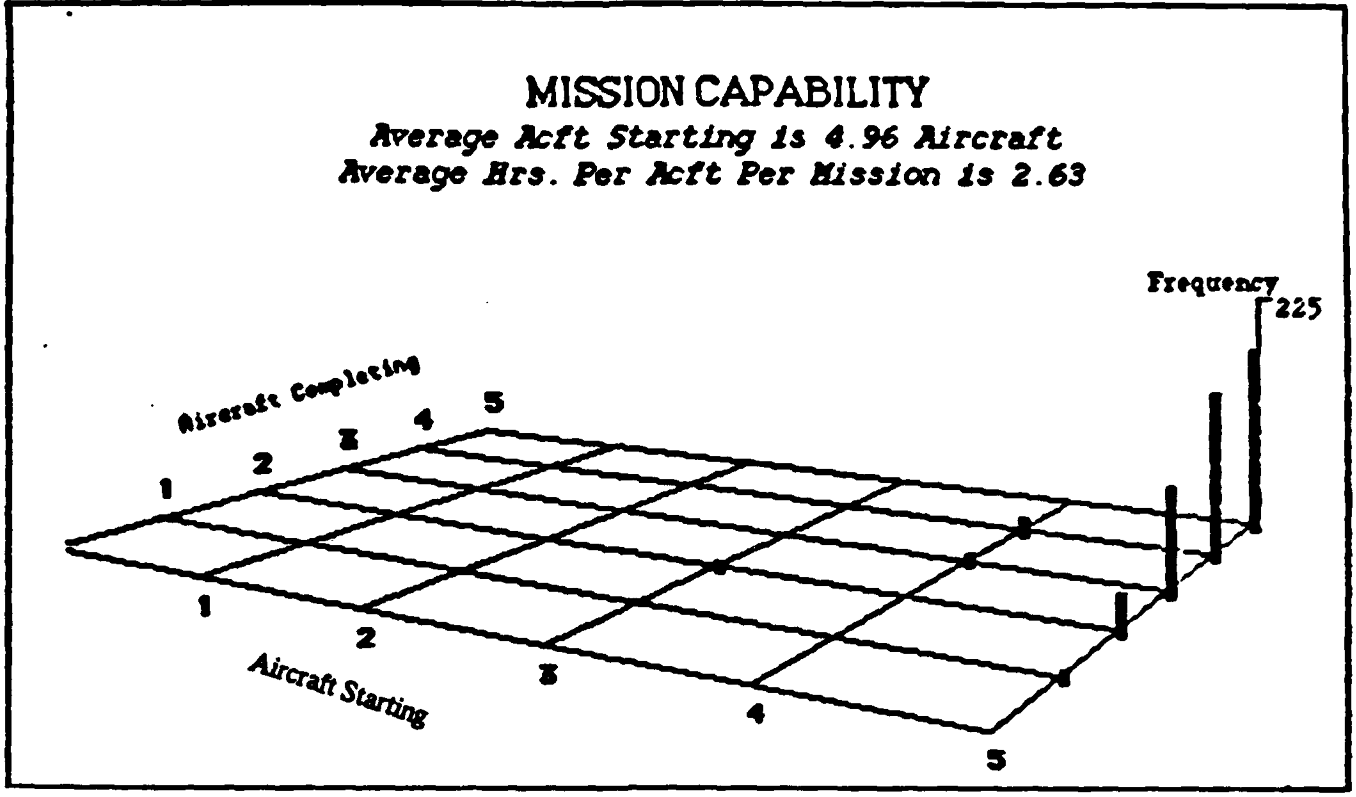


Figure 10. Base Case Mission Capability Profile-Recon (5 acft)(ARS)

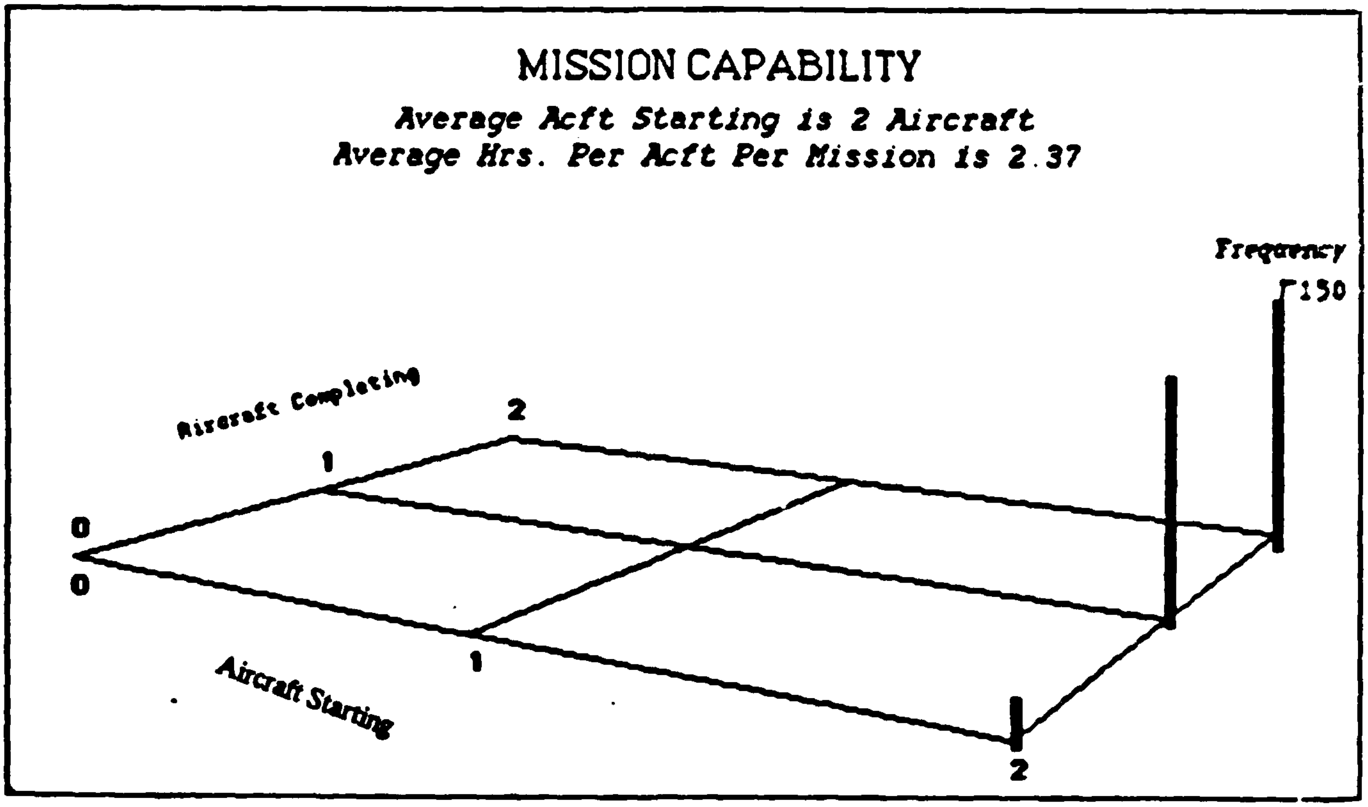


Figure 11. Base Case Mission Capability Profile-Recon (2 acft)(ARS)

Aircraft Starting = The number of aircraft able to start the mission.

Aircraft Completing = The number of aircraft performing an entire 3 hr. mission.

Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Presented in Table 3 are the average number and percentage of aircraft successfully launched per mission, the average number of hours flown per aircraft per mission, and the average percentage of aircraft completing each mission for the attack, the utility, and the reconnaissance missions. An examination of this table reveals that each mission scenario has an average successful launch rate of at least 90% for their respective mission aircraft.

Table 3

<u>Summary of Base Case Mission Capability</u>

Mission	Req Acft	Average Successful Launches Number	Average Successful Launches Percent	Average Hrs/Acft/Mssn	Average Percentage Completing
Attack	8	7.76	97%	2.63	78.6%
Utility	3	2.97	99%	2.57	83.4%
Recon	5	4.96	99%	2.63	80.7%
Recon	2	2	100%	2.37	71.9%

In all cases except for the reconnaissance mission using two aircraft, the average percentage of aircraft completing each mission is approximately 80%. The reconnaissance mission requiring two aircraft is slightly lower in terms of mission completion and mission duration since there are a fewer number of aircraft to perform the mission and if one aircraft fails, the percentage of completion is reduced to 50%.

Another measure of mission capability is through the percentage of time aircraft are capable of being launched and the percentage of time that aircraft complete the mission. Table 4 displays these percentages for each mission scenario. Through examination of Table 4, it can be determined that over 80% of the time for the attack mission and over 90% of the time for the utility and reconnaissance missions, the required number of mission aircraft are available to perform the mission.

Table 4

Mission Accomplishment for Base Case

Mission Scenario	Number of Aircraft	Percent at Start of Mission	Percent at End of Mission
Attack	0	0%	0%
	1	0%	0%
	2	0%	1.4%
	3	.3%	1.7%
	4	.3%	9.4%
	5	1.0%	18.4%
	6	3.1%	27.4%
	7	11.5%	26.4%
	8	83.7%	15.3%
Utility	0	.7%	1.0%
	1	.3%	5.2%
	2	.7%	36.8%
	3	98.3%	56.9%
Recon (5 acft)	0	0%	0%
	1	0%	1.0%
	2	0%	6.9%
	3	.5%	20.6%
	4	2.9%	34.3%
	5	96.6%	37.3%
Recon (2 acft)	0	0%	6.2%
	1	0%	43.8%
	2	100%	50.0%

Table 5 presents the workload and strength required for operator (aviators); maintainer (repairers); and Class III (MOS 55B), Class V (MOS 77F), and Class IX (76 Series MOS) supply personnel by organizational level for each mission scenario given the personnel authorized by the AOE TOE. The workload is presented by MOS and was derived based upon 3.4 direct maintenance man-hours per day and 2.5 indirect maintenance man-hours per day. As can be seen from Table 5, most MOSs are significantly less than the current strength authorized in the AOE TOE.

Table 5

LHX Personnel Authorized and Projected for Base Case

PERSONNEL	AHC		HSC		ART		HHT		HHC CAB		AMC		FSC	
TYPE/MOS	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX
AVIATORS	18	13		1	11	12			6	14				
REPAIRERS														
66J			1	2			1	1			1	3		
66(1)			7	3			5	1	1	1	8	7		
67(2)	11	9	15	1	10	8	10	1	6	0	37	3		
68(3)			4	1			2	1			11	4		
68(4)			9	3			8	2			12	5		
68G			3	1			2	1			4	1.6		
68H			0	0			0	0			3	1		
68K			1	1			1	1			1	1		
35(5)			9	2			3	1			15	4		
SUPPLY														
55B			0	32			0	20	25	12	0		8	.79
76 SERIES			4	1			4	1	0	1	8	2	0	
77F			0	32			0	20	42	12	0		0	N/A

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

The supply manpower requirements for the base case are also presented in Table 5. The Class III and V requirements were derived from the LHX Draft FSD RFP requirements that resupply requires two men to rearm (MOS 55B) or refuel (MOS 77F) each aircraft. The Class V manpower requirements for the LHX in the DISCOM were derived using the Class V supply model, the LHX ammunition requirements specified in the LHX Draft FSD RFP, and the mission data supplied from the operations and maintenance module. The Class III requirements for the CAB exceed the storage capacity of the S&T BN. Organic resupply is assumed as implied by Section I of the TOE of the S&T BN. It is also assumed that resupply is available from non-divisional sources since LHX consumption exceeds the S&T BN distribution capacity of 8,100 gallons. Class IX manpower requirements (76 Series MOS) were developed in the Class IX supply model as discussed in the MANCAP Application to the LHX section by inputting the number of parts requested at each repair level by type unit.

Aircraft status is given by the percentage of time in which an aircraft is "available for mission," "not mission capable," or "operational but not available". Aircraft status is expressed in average hours per day per aircraft. Table 6 displays the aircraft status for the three mission scenarios.

Table 6

Aircraft Status for Base Case

	HOURS PER DAY PER AIRCRAFT		
	ATTACK	RECON	UTILITY
AVAILABLE FOR MISSION (includes time on missions)	12.78	12.71	9.86
NOT MISSION CAPABLE:			
ON FLIGHT LINE	1.27	3.77	2.63
IN TRANSIT TO HQS LVL	.49	.39	0.0
AT HQS LVL	4.18	2.25	0.0
IN TRANSIT TO AMC	.29	.28	.44
AT AMC	4.57	4.25	10.69
TOTAL	10.80	10.94	13.76
OPERATIONAL BUT NOT AVAILABLE:			
IN TRANSIT FROM AMC	.26	.26	.38
IN TRANSIT FROM HQS LVL	.16	.10	.00
OVERDUE DAILY	.00	.00	.00
TOTAL	.42	.36	.38

From examining Table 6, it can be seen that the majority of "not mission capable" time is spent either at the headquarters level (HSC for the attack mission or HHT for the reconnaissance mission) or the AMC. This is due to the delay time in transit, the delay time awaiting personnel, and the additional time required to inspect repairs. Repairs performed on the flight line do not have to wait for the needed MOS because there is a LHX repairer, MOS 67(2), allocated to each aircraft. Also, since there are not any technical inspectors assigned to the aviation companies, the models assume that flight line repairs do not require technical inspection. The amount of non-mission capable time spent at AMC is significantly higher for the utility mission than for the attack or reconnaissance since there is no headquarters level of repair for the HHC CAB.

Table 7 presents the time in man-hours per day per unit spent awaiting LHX repairers at each level. In examining Table 7, it can be seen that the majority of wait time is for an aircraft armament technical inspector (MOS 66J). This is because MOS 66J must inspect all armament repairs before returning them to mission capable status. Inspections require .96 hours direct maintenance time to perform. Since there are only 3.4 hours of direct time available, a large backlog accumulates for the one authorized MOS 66J located at the headquarters level and the AMC.

Table 7

Equipment Awaiting Maintenance Personnel for Base Case

Level and Associated MOS	Man-Hours per Day		
	AHB (Attack)	ARS (Recon)	HHC CAB (Utility)
Company			
67(2)	0.0	0.0	0.0
Headquarters			
66J	9.46	7.19	0.0
66(1)	0.07	0.01	0.0
67(2)	0.0	0.0	0.0
68(3)	0.08	0.14	0.0
68(4)	0.02	0.01	0.0
68G	0.25	0.19	0.0
68H	0.0	0.0	0.0
68K	4.09	1.39	0.0
35(5)	0.00	.18	0.0
AMC			
66J	13.64	8.27	3.53
66(1)	0.39	0.04	0.0
67(2)	0.0	0.0	0.0
68(3)	0.03	0.0	0.0
68(4)	0.0	0.0	0.0
68G	0.05	0.0	0.0
68H	0.45	0.28	0.04
68K	2.65	0.85	0.78
35(5)	0.0	0.0	0.0

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Sensitivity Analysis-Reduction of HSC and HHT Maintenance Personnel

The first sensitivity analysis was performed in an attempt to reduce the number of LHX maintenance personnel at the headquarters level (HSC and HHT) without significantly affecting mission capability or supply requirements. The maintenance personnel currently allocated to the company level and AMC remained constant due to the assumption that there was to be one LHX repairer, MOS 67(2), allocated per aircraft and the requirement that AMC personnel work on other division aircraft besides LHX aircraft. The analysis was performed based upon the workload projections for each MOS at each level of maintenance in the base case discussed above. The personnel strength projections from the base case were reallocated and used as the input maintenance manpower data. The models were then executed to determine the impact of reduced personnel on mission capability. Table 8 displays the number and types of personnel required for this sensitivity.

Table 8

Personnel Projected for Reduced HSC and HHT Maintenance Strength

Personnel Type/MOS	AHC	HSC	ART	HHT	HHC CAB	AMC	FSC
Aviator	13		12		14		
Repairers							
66J		1		1		4	
66(1)		1		1	0	8	
67(2)	10	1	8	0	8	3.8	
68(3)		1		1		4	
68(4)		2		1		7	
68G		1		1		3	
68H		0		0		1	
68K		1		1		1	
35(5)		1		0		4.5	
Supply							
55B		32		20	12	-	.79
76 Series		1		1	1	3	-
77F		32		20	12	-	N/A

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 9 displays the time in man-hours per day aircraft spent awaiting individual repair MOSs at each level of maintenance by type unit. When comparing Table 9 with Table 7, it can be seen that the waiting times increased for the case with reduced people.

Table 9

Equipment Awaiting Maintenance Personnel for Reduced HSC and HHT Maintenance Strength

	Man-Hours per Day		
Level and Associated MOS	AHB (Attack)	ARS (Recon)	HHC CAB (Utility)
Company			
67(2)	0.0	0.0	0.0
Headquarters			
66J	8.35	2.54	0.0
66(1)	.75	11.07	0.0
67(2)	.04	.53	0.0
68(3)	1.59	.16	0.0
68(4)	.31	.40	0.0
68G	2.77	1.39	0.0
68H	0.0	0.0	0.0
68K	3.35	1.65	0.0
35(5)	.25	.41	0.0
AMC			
66J	21.6	11.23	3.53
66(1)	1.03	.12	0.0
67(2)	0.0	0.0	0.0
68(3)	0.0	0.0	0.0
68(4)	.05	0.0	0.0
68G	.12	.11	0.0
68H	.44	.28	.04
68K	1.94	1.11	.78
35(5)	0.0	.01	0.0

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 10 displays the aircraft status for each mission scenario when the number of maintenance personnel at the HSC and HHT is reduced as shown in Table 8. The "not mission capable" times for the attack and reconnaissance mission scenarios each decreased due to a reduction in "not mission capable" times at either the flight line or the headquarters level or both. Although the "not mission capable" times increased at the AMC for the reconnaissance mission scenario, the increase was not significant which indicates that repairs were not being directed to higher levels of maintenance because personnel were not available at the HHT. For example, in the base case (Table 6) the hours spent per day per aircraft at AMC for the attack mission are 4.57 as opposed to 4.41 for the case of reduced HSC and HHT maintenance personnel.

Table 10

Aircraft Status for Reduced HSC and HHT Maintenance Strength

	HOURS PER DAY PER AIRCRAFT		
	ATTACK	RECON	UTILITY
AVAILABLE FOR MISSION: (includes time on missions)	14.92	13.27	9.83
NOT MISSION CAPABLE:			
ON FLIGHT LINE	2.01	1.87	2.62
IN TRANSIT TO HQS LVL	.48	.38	.00
AT HQS LVL	1.38	2.18	.00
IN TRANSIT TO AMC	.39	.33	.45
AT AMC	4.41	5.63	10.73
TOTAL	8.67	10.39	13.80
OPERATIONAL BUT NOT AVAILABLE:			
IN TRANSIT FROM AMC	.34	.29	.39
IN TRANSIT FROM HQS LVL	.07	.05	.00
OVERDUE DAILY	.00	.00	.00
TOTAL	.41	.34	.39

The reduction of HSC and HHT maintenance personnel did not significantly affect the number of aircraft launches when compared to the base case. Figures 12 through 15 illustrate the mission capability profile for the attack, reconnaissance, and utility missions. Upon examination of these figures and the base case results, it can be seen that the average number of successful launches per mission only changed by a maximum of .06.

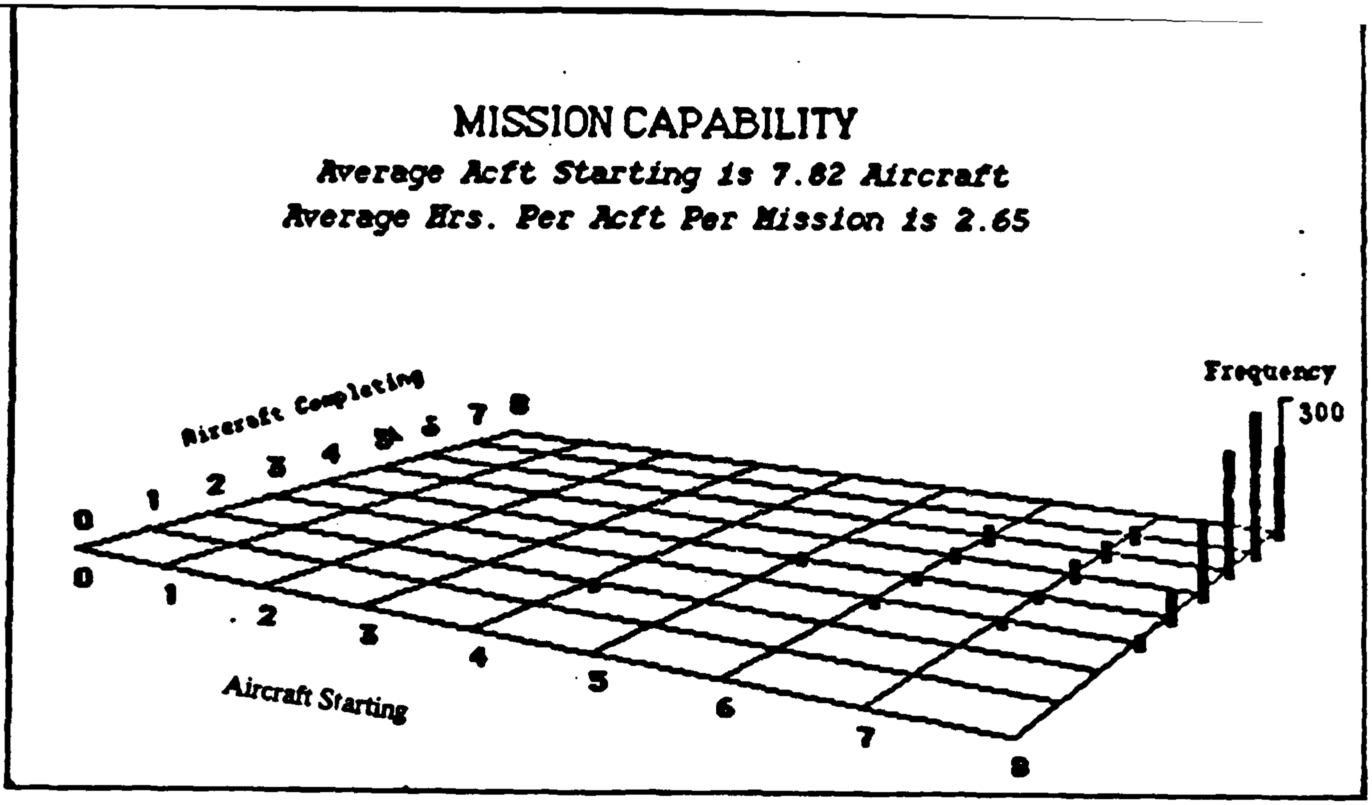


Figure 12. Mission Capability Profile-Attack - Reduced Personnel

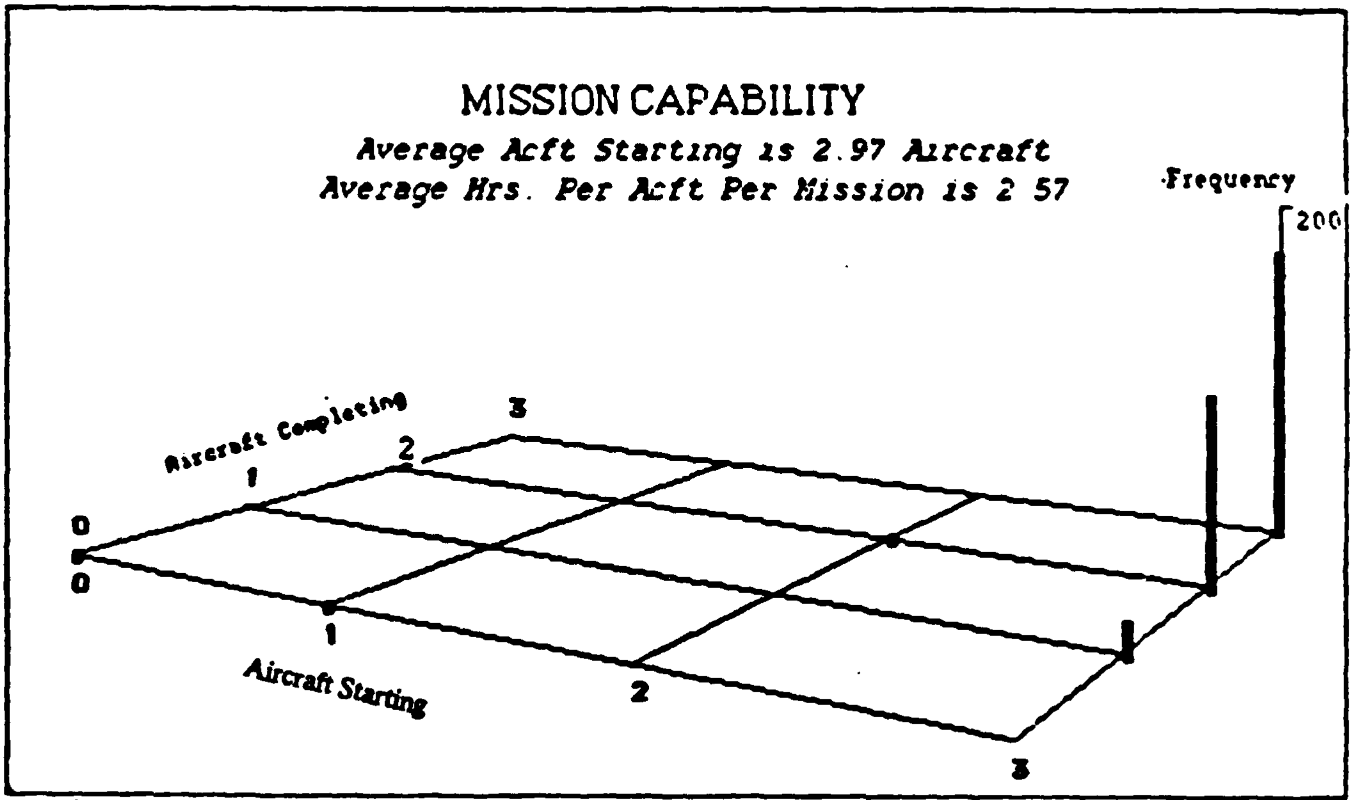


Figure 13. Mission Capability Prof'le-Utility - Reduced Personnel

Aircraft Starting	= The number of aircraft able to start the mission.
Aircraft completing	= The number of aircraft performing an entire 3 hr. mission.
Frequency	= The number of missions with the configuration indicated by the intersection of the aircraft starting and aircraft completing axes.

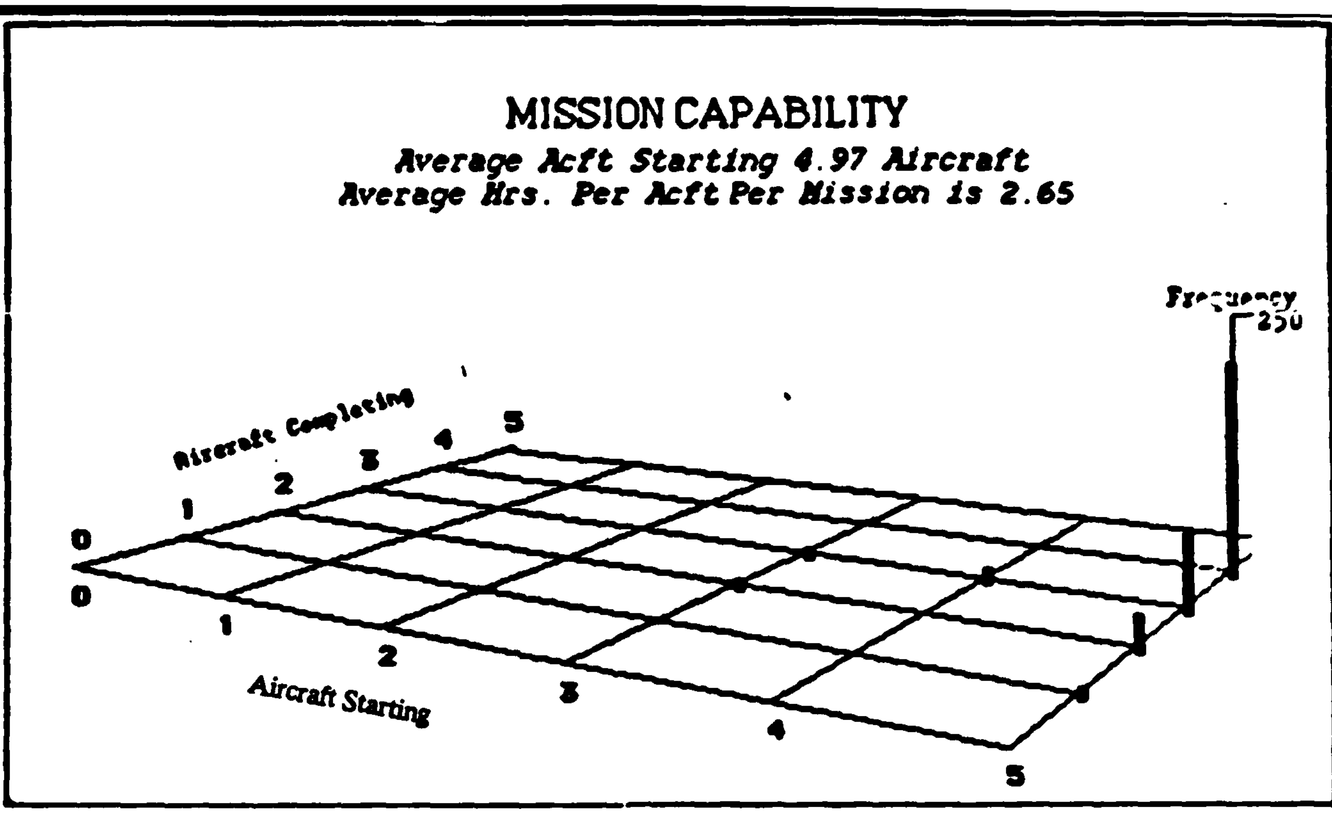


Figure 14. Mission Capability Profile-Recon (5 acft) - Reduced Personnel

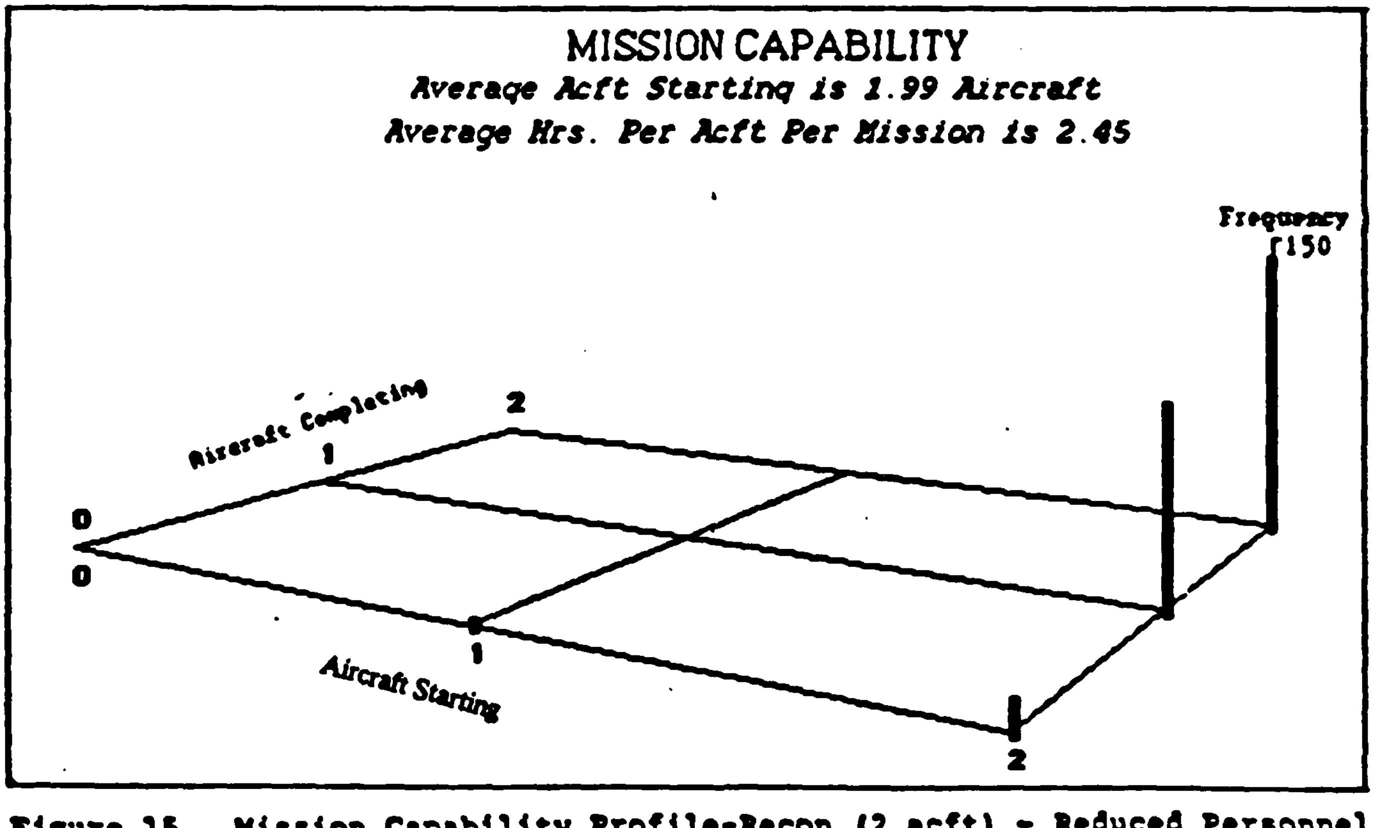


Figure 15. Mission Capability Profile-Recon (2 acft) - Reduced Personnel

Aircraft Starting = The number of aircraft able to start the mission.

Aircraft Completing = The number of aircraft performing an entire 3 hr. mission.

Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Table 11 displays the percentage of time aircraft started or completed a mission. It shows that over 85% of the time the required number of mission aircraft are available to start a mission.

Table 11

Mission Accomplishment for Reduced HSC and HHT Maintenance Strength

Mission Scenarios	Number of Aircraft	Percent Time Acft Started a Mission	Percent Time Acft Completed a Mission
ATTACK	0	0%	0%
	1	0%	0%
	2	0%	.3%
	3	0%	1.4%
	4	.3%	6.2%
	5	.3%	17.4%
	6	4.5%	27.4%
	7	6.6%	29.5%
	8	88.2%	17.7%
UTILITY	0	.7%	1.0%
	1	.3%	5.2%
	2	.7%	36.8%
	3	98.3%	56.9%
RECON (5 acft)	0	0%	0%
	1	0%	1.0%
	2	0%	5.9%
	3	1.0%	15.7%
	4	1.5%	41.7%
	5	97.5%	35.8%
RECON (2 acft)	0	0%	5.6%
	1	.7%	37.5%
	2	99.3%	56.9%

The supply models were also recalculated based upon the information obtained from the simulation model sensitivity run. However, since there was no significant impact on the mission duration, aircraft availability, or number of missions flown, there was no significant impact on supply requirements for this sensitivity. In fact, since LHX system requirements specify the numbers of personnel required to perform refueling and rearming operations, the Class III and V supply requirements remained the same as the base case. The Class IX requirements changed somewhat but only due to slight changes in average mission durations.

Sensitivity Analysis-Elimination of AMC Personnel

The third sensitivity performed was an analysis of what impact elimination of the AMC would have on mission capability and maintenance workload at the headquarters and unit level. For this sensitivity, the LHX attack mission was examined since it places the greatest demand on AMC personnel. The personnel allocated to the HSC were determined based upon the HSC and AMC base case projected workload. The workloads were summed and the total projected strength was then allocated to the HSC with the AMC strength reduced to zero. Table 12 displays the allocation of maintenance personnel for this sensitivity and the simulation generated workload for each MOS. Although the AMC personnel strength was allocated to the HSC, the allocation still resulted in a reduction of 23 personnel at the HSC from the AOE TOE.

Table 12

AHB Maintenance Manpower Required with Elimination of AMC*

Level	MOS	Workload	Projected Strength	Allocation
AHC	67(2)	8.8	9.0	11
HSC	66J	3.0	3.0	3
	66(1)	5.5	6.0	6
	67(2)	1.6	2.0	2
	68(3)	2.1	3.0	3
	68(4)	4.8	5.0	5
	68G	1.6	2.0	2
	68H	0.4	1.0	1
	68K	0.7	1.0	1
	35(5)	2.8	3.0	3

*Expressed in terms of numbers of maintainer personnel

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 13 displays the time in man-hours per day aircraft spent awaiting LHX repairers at the AHC and HSC if there is no higher maintenance level available. Although, when compared with Table 7, the time awaiting personnel increased for the majority of the MOSs in the HSC when the AMC was eliminated, the total time in "not mission capable" status remained approximately the same as can be seen by comparing Table 14 and Table 6.

Table 13

Equipment Awaiting Maintenance Personnel with Elimination of AMC

Level	MOS	Man-Hours per Day
AHC	67(2)	0
HSC	66J	3.6
	66(1)	2.0
	67(2)	1.12
	68(3)	.94
	68(4)	.98
	68G	1.19
	68H	3.17
	68K	4.27
	35(5)	1.21

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 14

Attack Aircraft Status with Elimination of AMC*

AVAILABLE FOR MISSION: (includes time on missions)	13.00
NOT MISSION CAPABLE:	
ON FLIGHT LINE	3.06
IN TRANSIT TO HSC	0.47
AT HSC	7.04
IN TRANSIT TO AMC	0.00
AT AMC	0.00
TOTAL	10.57
OPERATIONAL BUT NOT AVAILABLE:	
IN TRANSIT FROM AMC	0.00
IN TRANSIT FROM HSC	0.43
OVERDUE DAILY	0.00
TOTAL	0.43

*Expressed in hours per day per aircraft

Figure 16 illustrates the mission capability profile for the attack mission with the AMC eliminated. In this case, the average number of successful launches per mission was 7.67 which is approximately a .1 reduction from the base case shown in Table 3.

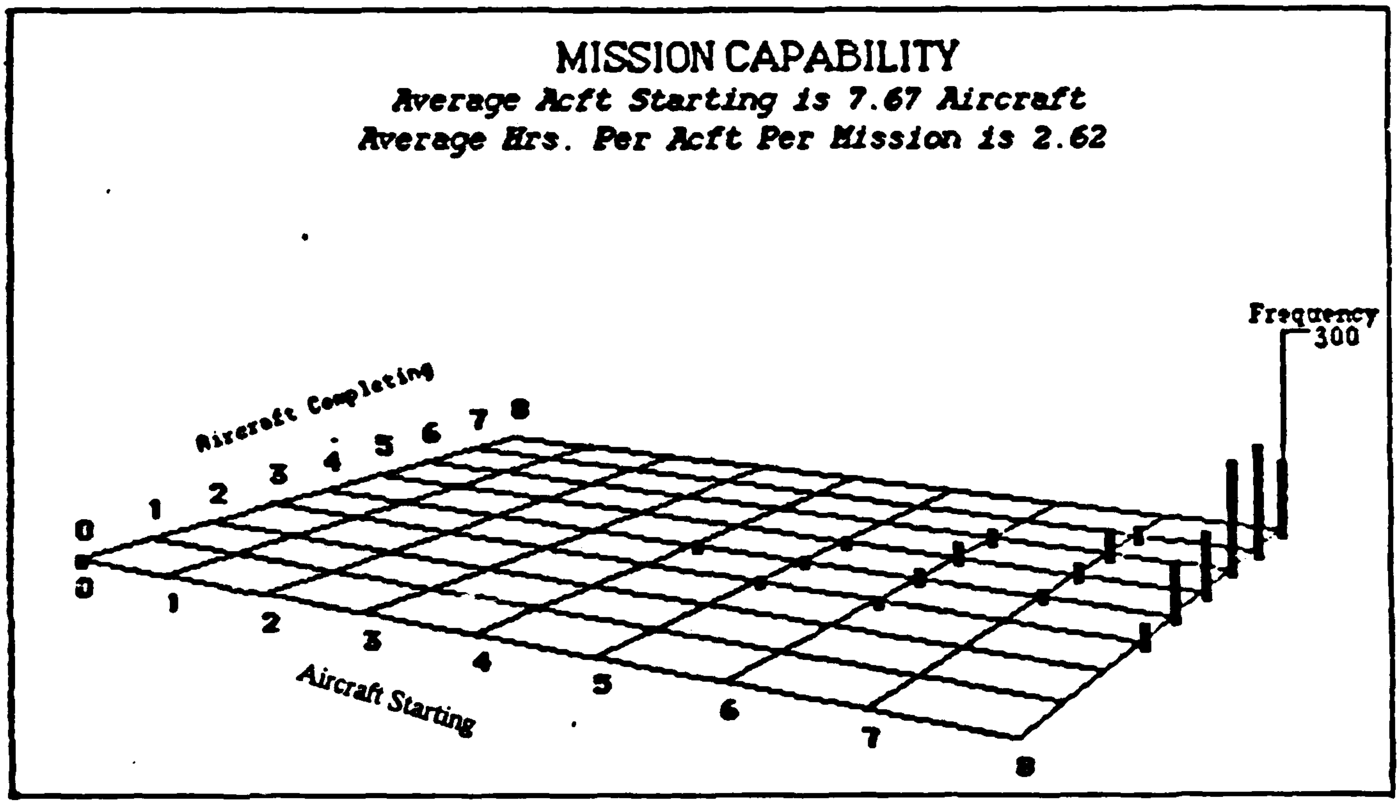
Table 15 presents the percentage of mission starts and completions for 288 simulated attack missions. Even with elimination of the AMC, Table 15 shows that the AHC still retained the capability to launch eight aircraft over 80% of the time for an attack mission.

Table 15

Mission Accomplishment with Elimination of AMC

Number of Aircraft	Percent Time Acft Started a Mission	Percent Time Acft Completed a Mission
0	.3%	.3%
1	0%	0%
2	0%	0%
3	0%	3.8%
4	.7%	13.9%
5	1.7%	16.7%
6	6.2%	27.4%
7	9.7%	23.3%
8	81.2%	14.6%

Applying the data resulting from the sensitivity analysis eliminating the AMC, results in minor variations to the supply requirements. This is due to the minor changes in aircraft availability and average mission duration. The average mission duration was reduced by .01 hour which is insignificant and does not affect the supply support required to support the attack mission.



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Figure 16. Attack mission capability profile-elimination of AMC.

Sensitivity Analysis-Reduction in Allocated Aircraft

The final sensitivity that was performed was an investigation of the impact that a reduction in the number of aircraft authorized per unit would have on mission capability, maintenance workload, and supply support required. Again, this sensitivity was only performed for the attack mission scenario since it was the most stringent mission profile and required the most flying hours of the missions analyzed.

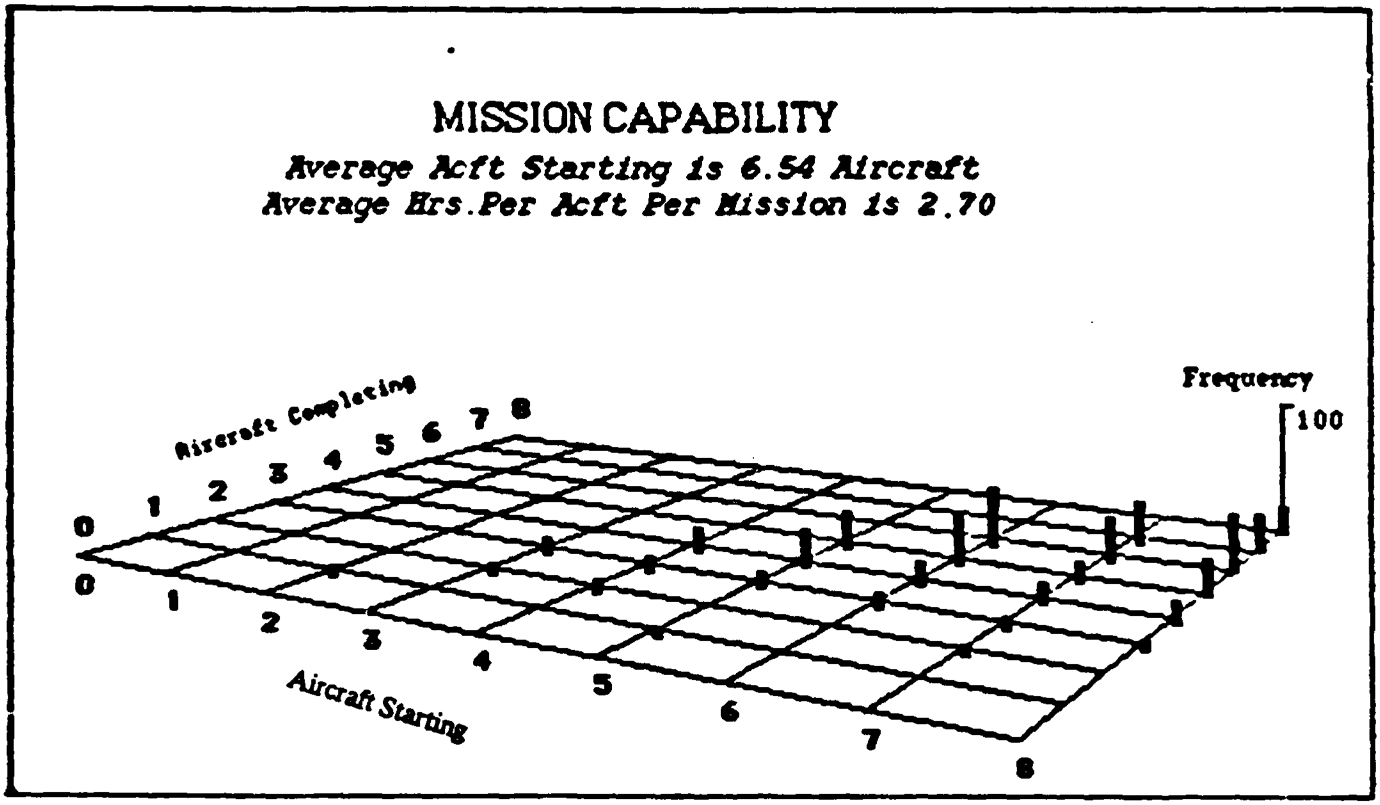
Figure 17 illustrates the mission capability profile of this case. When compared to the base case shown in Table 3, the number of successful launches per mission was decreased from 7.76 to 6.54.

Table 16 displays the percentage of time aircraft start and complete missions for 288 simulated attack missions. In the case where the number of aircraft was reduced from 11 to eight, only 33% of the time were there sufficient aircraft to launch a full attack mission complement, and only 5.2% of the time did all eight aircraft complete the mission as compared to 15.3% of the time in the base case shown in Table 4.

Table 16

Mission Accomplishment for Reduction of Aircraft from 11 to 8

Number of Aircraft	Percent Time Acft Started a Mission	Percent Time Acft Completed a Mission
0	0%	0%
1	0%	.7%
2	.3%	2.1%
3	2.1%	7.3%
4	6.2%	17.4%
5	13.5%	23.6%
6	23.3%	28.8%
7	21.5%	14.9%
8	33.0%	5.2%



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Figure 17. Attack mission capability profile-reduced aircraft strength.

Table 17 presents the workload and projected strength required to support the attack mission given an aircraft strength of eight. When comparing to the base case, Table 5, the only significant workload change was for the LHX repairer, MOS 67(2), at the AHC. Although there are fewer aircraft to repair, the distribution of workload (approximately 24% to the flight line) was such that there was no change after rounding to determine the required number of repairers above the flight line.

Table 17

Maintenance Manpower Strength for Reduction of Aircraft from 11 to 8*

Level	MOS	Authorized	Required Strength	Projected Strength
AHC	67(2)	11	7.3	8
HSC	66J	1	1.4	2
	66(1)	7	2.4	3
	67(2)	15	.5	1
	68(3)	4	1.0	1
	68(4)	9	2.5	3
	68G	3	.8	1
	68H	0	0	0
	68K	1	.5	1
	35(5)	9	1.2	2
AMC	66J	1	1.4	2
	66(1)	8	3.9	4
	67(2)	37	1.5	2
	68(3)	11	2.0	2
	68(4)	12	2.5	3
	68G	4	1.1	2
	68H	3	.5	1
	68K	1	.4	1
	35(5)	15	2.1	3

*Expressed in terms of numbers of maintainer personnel

Notes: AMC strength figures are based on the attack mission only and does not include the impact of the reconnaissance or utility missions.

66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

Table 18 displays the aircraft status times for the sensitivity. Comparing to the base case, the total time aircraft spent in "not mission capable" status did not change appreciably. In short, about the same amount of repairs are performed whether there are eight or 11 aircraft per company.

Table 18

Attack Aircraft Status for Base Case and Reduced Aircraft*

	BASE CASE	REDUCED ACFT
AVAILABLE FOR MISSION: (includes time on missions)	12.78	11.70
NOT MISSION CAPABLE:		
ON FLIGHT LINE	1.27	3.59
IN TRANSIT TO HSC	.49	.54
AT HSC	4.18	2.67
IN TRANSIT TO AMC	.29	.32
AT AMC	4.57	4.72
TOTAL	10.80	11.84
OPERATIONAL BUT NOT AVAILABLE:		
IN TRANSIT FROM AMC	.26	.28
IN TRANSIT FROM HSC	.16	.18
OVERDUE DAILY	.00	.00
TOTAL	.42	.46

*Expressed in hours per day per aircraft

Table 19 presents the supply support required to support the attack mission profile equipped with eight aircraft per company. The number of Class III and V personnel required did not change from the base case (see Table 8) since there were still the same number of missions flown. Also, since the number of maintenance actions did not decrease, the Class IX supply requirements did not significantly change as a result of reduced aircraft strength.

Table 19

Supply Manpower Requirements for Attack Mission with Reduction of Aircraft

	HSC	DISCOM
Class III (MOS 55B)	32	N/A
Class V (MOS 77F)	32	0.31
Class IX (76 Series MOS)	1	1

CONCLUSIONS

General

The research team has concluded that the MANCAP methodology is sound, the objectives of the research were attained, and the LHX specific information developed will make a significant contribution to the development of the LHX.

First, the successful application to the LHX conclusively demonstrated that meaningful manpower and personnel data can be derived from the limited data available in the early stages of concept exploration without expending a large amount of time or money to manipulate historical data. Equally important, the concept of directly linking operator and support manpower to the mission capability of an entire organization was also shown to be viable. The development of that link also provides a method of expressing mission capability that goes beyond the standard expression of equipment availability (A_O). A_O is limited to a percentage achieved over a given time period. As such it does not indicate the capability to meet a time specific mission requirement. For example, if an organization with 30 aircraft is required to accomplish the AHC mission profile an availability (A_O) of 80% does not indicate mission success. Rather, it indicates only that 50% of the time during period investigated, there were less than eight aircraft available to accomplish the mission. By comparison, the expressions of mission capability used in this analysis (aircraft launched, aircraft completing, average mission duration for one aircraft) provide a clear picture of the ability to satisfy a mission required at specified times.

The second objective, flexibility, was also attained. Through the technique discussed in the Method section of defining the overall system in terms of assumptions and rules, it was possible to build the appropriate level of accessibility into the models. That is, only those things that are generally true throughout the U.S. Army are firmly embedded in the structure of

the models. Whereas, adjustments to total system characteristics that are relatively fixed but not truly generic can be accommodated by minor changes in the models and those characteristics that change frequently are interactive. The result is that the MANCAP method can be applied to a wide range of systems.

The models are also fast and inexpensive to run. The speed is a function of the architecture of the models and the costs were kept in check by designing the models to run on personal-size computers. The simulation model requires slightly over an hour to exercise the Combat Aviation Brigade in the Light Infantry Division and produce all the outputs relative to mission accomplishment, aircraft maintenance history, and maintenance personnel requirements. The remaining data are developed in spreadsheet models which further manipulate the simulation outputs. The spreadsheet models require less than 15 minutes to input the data and only seconds to accomplish the calculations. In the current stage of development, the simulation model is run on an Apple MacIntosh computer. The spreadsheets, developed using Lotus 1-2-3, run on an IBM-compatible personal computer. The use of personal-size computers not only tends to control equipment costs, but also eliminates the expense and time associated with employing computer specialists to operate mainframe computers.

By successfully accomplishing the above goals, this effort has produced a method of analysis and computer models that are excellent tools for investigating and analyzing military weapon systems and the larger organizational system in which they operate. The interactive nature of the models, coupled with their speed and relatively low cost, can enable an analyst to conduct sensitivity analyses on a wide array of manpower, personnel, weapon system, organizational, and doctrinal factors. In each case, the interaction between all of the system elements can be determined and the collective impact of that interaction on organizational mission capability can be demonstrated.

Application to the LHX

As a result of applying the MANCAP method to the LHX, the research team concluded that if the RAM goals are achieved, the LHX will require significantly fewer maintenance, supply and operator personnel than are currently authorized in the Army of Excellence TOE. Further, the Class III and V Platoon of the HHC CAB is capable of supporting the mission without a direct support level supply of POL provided there is a general support source of bulk fuel. The burden for direct support level supply of ammunition in the S&T Battalion of the DISCOM is well within the current capability. The personnel requirements discussed in detail in the LHX Results and Sensitivity Analyses section (see Table 5), are reiterated for convenience, in Table 20.

Table 20

LHX Personnel Authorized and Projected for Base Case

PERSONNEL	AHC		HSC		ART		HHT		HHC	CAB	AMC		FSC	
TYPE/MOS	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX	AOE	LHX
AVIATORS	18	13		1	11	12			6	14				
REPAIRERS														
66J			1	2			1	1			1	3		
66(1)			7	3			5	1	1	1	8	7		
67(2)	11	9	15	1	10	8	10	1	6	0	37	3		
68(3)			4	1			2	1			11	4		
68(4)			9	3			8	2			12	5		
68G			3	1			2	1			4	1.6		
68H			0	0			0	0			3	1		
68K			1	1			1	1			1	1		
35(5)			9	2			3	1			15	4		
SUPPLY														
55B			0	32			0	20	25	12	0		8	.79
76 SERIES			4	1			4	1	0	1	8	2	0	
77F			0	32			0	20	42	12	0		0	N/A

Note: 66(1) - LHX Technical Inspector
67(2) - LHX Repairer
68(3) - Engine and Powertrain Repairer
68(4) - Electrician/Armament/Fire Control Repairer
35(5) - Avionics Equipment Repairer/Technical Inspector

As indicated in the Table 20, although the total personnel requirements are reduced, some cross leveling across MOS is required, most notably for the technical inspectors. In interpreting and applying the manpower and personnel data presented, it should be recognized that this application of the methodology does not consider the requirements for nor the impacts of depot level maintenance.

The sensitivity analyses indicate that insofar as reliability failures are concerned, a third organizational level of maintenance (AMC) is unnecessary. That conclusion is based on the fact that when the AMC personnel are redistributed proportionally to the Service Platoon, there is no significant change in mission capability. However, in its current form, the model does not consider surge maintenance requirements nor the support of other aviation units that may be attached to or operating within the division.

The changes to the structure of the models eliminated the need to degrade personnel across the board as was done in the first phase of this investigation. The interactive nature of personnel strengths input into the models allows degradation to be evaluated much more precisely by performing "what if" exercises. That is, as threat information and its effect on unit strength in various scenarios becomes available, the precise distribution of personnel losses can be input and the residual mission capability will be output. In the absence of any specific threat data, the degradation sensitivities were not attempted.

Future Applications and Extensions

The generic and flexible nature of the MANCAP method and models make it appropriate to a wide variety of MPT investigations which include further investigations of the LHX, of other weapon systems, and of other dimensions of the total system such as doctrine and force structure.

The most immediate application opportunity is to extend the investigation of the comparability of the LHX with the predecessor systems by exercising the predecessors in the models in the context of comparable mission scenarios. Such a comparison would be relatively straightforward in that it only requires assembly of the historical data pertinent to the predecessor systems and adjustment of the mission scenarios to accommodate the different mix of aircraft. The benefits would be two-fold. First, the techniques for using the methodology as a comparability analyses in lieu of a requirements analysis would be more fully developed. Second, the information developed would be useful to the LHX acquisition community. This application would also serve as a step toward validating the MANCAP model because it would calibrate the model to existing systems that, in turn, would enable comparison of model outputs to historical data or to a current activity such as the MAXFLY test being conducted under the auspices of the U.S. Army Aviation Logistics School.

Other useful applications of the MANCAP method to the LHX program include investigation of the effects of various crew complement options, investigation of MOS consolidation options and benefits, and investigation into the feasibility of increasing the fidelity of the models to accommodate more variable mission scenarios and the different attributes of the major subsystems of weapon system (i.e., engine, rotor system and drive train, mission equipment package, avionics etc.). Again, these applications would serve the dual purpose of providing useful information to the LHX planners and extending the method of analysis.

Application To Other Systems

As has been stated several times, the method is intentionally generic and can be applied to most systems. Furthermore, application is not limited to weapons currently in the acquisition process. It will apply equally well to investigations into the MPT and mission capability cause and effect relationships of fielded weapons to quantify existing requirements, to investigate the ramifications of product improvements, or to investigate doctrinal or force structure changes. Although the MANCAP method could be applied in its current form to any of these efforts, the research and development challenge would be to extend the approach so that cost and run time would not increase dramatically in order to achieve increased resolution and fidelity.

The major advantages of this method of analysis are its speed and relatively low cost which make it extremely useful to the analyst particularly in performing "what if" analyses. The key to sustaining these advantages lies in the modular architecture and its interactive nature. The current level of development, although extremely useful, has not begun to approach its technological limitations. Further development holds great promise to the design of a total set of tools that will enable planners to make more efficient and effective use of manpower resources throughout the military establishment.

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APPENDIX A
ATTRIBUTES

The attributes of the system employed in the mission simulation that are not included in the functional flow diagram are listed in this appendix under the headings of assumptions, semi-fixed parameters, or interactive parameters.

<u>Assumptions</u>

1. All individuals will begin their shift at time = 0.

2. All maintenance actions will be managed in a tub file at each level of maintenance.

3. Once an individual begins to perform a maintenance action (repairs or trouble-shooting), he will take the action to the next status before returning it to the tub file and checking his remaining time.

4. It is assumed that individuals will obtain supply parts at the lowest level possible. (i.e., parts will be requested from the PLL stock before requesting parts from the ASL stock, assuming that the aircraft is located at that level of maintenance or below).

5. The crew chief is the only individual able to take or retrieve an aircraft from higher maintenance or the field.

6. If the number of crew chiefs is less than the number of aircraft, overhead personnel will be sent to the HSC to obtain the parts needed.

7. The same MOS are available at HSC and AMC.

8. All aircraft repaired above the AHC must be checked by a technical inspector before returning to mission available status.

9. The technical inspectors, repairers at HSC, and AMC do not perform any other scheduled maintenance tasks. If time on their shift permits, they perform "other common soldier tasks."

10. All repairs checked by the technical inspector will be assumed to be correct. There will be no repairs rejected by the technical inspector.

11. All aircraft are repairable.

12. All EMAs must be troubleshot.

13. The MTBMAF (8.4 hours) is used to derive the probability of an EMA during pre-flight and in-flight. All other failures will be discovered during post-flight based upon the probabilities derived from MTBEMA (4.5 hours).

14. A daily inspection must be performed before an aircraft is available for its first mission of the cycle.

15. All aircraft that are not flight line repairable will be transported to the HSC or AMC.

16. There are no parts available at the AHC. All parts must be obtained from the HSC or above.

17. All work orders are returned to the tub file after a supply part is ordered or is received before the aircraft is repaired.

18. All orders are processed according to first-in, first-out (FIFO) and priority of work category.

19. A part requirement is not a candidate for controlled substitution until all supply channels through the theater have been exhausted.

20. If an aircraft is located at the AMC for repair, an attempt is made to get the part from the AMC shop stock before requisitioning the part from the ASL.

21. If controlled substitution is available and elected to be employed, the same repairer will remove the part from the aircraft to be cannibalized.

22. All controlled substitution will be from downed aircraft located at the AMC.

23. When an aircraft is not available to be cannibalized or if there is not a float aircraft available, the only option is to wait for the part.

24. The float account will be maintained at the AMC.

<u>Semi-fixed Parameters</u>

1. Crew chiefs' duty days will coincide with the aircraft mission cycles.

2. If an individual is not available to perform a daily inspection, a launch, a recovery, or a post-flight, the aircraft will wait for the next crew chief available to perform the maintenance action.

3. When there are no parts needed to repair the aircraft and the aircraft is flight line repairable, the crew chief will repair the aircraft at the time of troubleshooting. The work order will not be placed in the tub file.

4. The priorities in the tub file are:

   a. Recover all down aircraft.
   b. Perform all daily inspections.
   c. Perform all launches.
   d. Recover all aircraft from missions.
   e. Recover all aircraft from higher levels of maintenance.
   f. Substitute any floats and transport to unit.
   g. Perform EMAs.
   h. Perform other maintenance actions (assuming direct maintenance time left and not end of mission cycle).
   i. Perform other tasks (assuming time left in mission cycle).

5. EMA work orders in the tub file have four status:

   a. EMAs that have not been troubleshot.
   b. EMAs awaiting maintenance.
   c. Repairs waiting to be inspected.
   d. EMAs awaiting parts.

6. At each aircraft status update, the individual will return the work order to the tub file, check his direct maintenance time and mission cycle time remaining, and get the highest priority from the tub file.

7. The crew chief will only remain with the aircraft at higher levels of maintenance when there is at least one crew chief per aircraft.

8. The proration of maintenance above the unit is derived from the LHX-PM MARC using the following steps.

   a. The total number of maintenance man-hours minus the number of scheduled maintenance man-hours equals the amount of unscheduled maintenance man-hours.

   b. The number of unscheduled maintenance man-hours minus the number of maintenance man-hours of technical inspectors equals the total number of unscheduled maintenance man-hours for the repairer.

   c. The total number of maintenance man-hours for the LHX repairer minus the number of scheduled

maintenance man-hours equals the total number of unscheduled maintenance man-hours for the LHX repairer.

d. The probability that an aircraft is not flight line repairable multiplied by the total number of repairer maintenance man-hours to obtain the total number of maintenance man-hours at the HSC and AMC.

e. The total number of maintenance man-hours at the HSC and AMC minus the number of maintenance man-hours of the trades MOS equals the number of maintenance man-hours of the LHX repairer at the HSC and AMC.

f. The total number of maintenance man-hours for each MOS at the HSC and AMC divided by the total maintenance man-hours at the HSC and AMC equals the percentage of workload for each MOS.

9. Class IX supply is derived from the authorized stockage levels as specified in SESAME and personnel workload as specified in MACRIT. The supply requirements generated by the model are then compared with the personnel workload to determine the Class IX supply manpower required for LHX units in the division.

10. Class III and V supply is derived based upon the doctrine that two supply persons are required to refuel or rearm an aircraft and the requirement that staff planning is to be conducted based upon 100 percent aircraft availability.

11. Class III supply requirements for the LHX exceed the Class III distribution capability of the S&T Battalion. Thus, organic resupply is assumed for the LHX with additional POL acquired outside the division. Further, the consumption exceeds the storage capability, thereby requiring an assumption that direct resupply from COSCOM is possible.

12. Class V supply personnel requirements in the ATP Section of the Forward Supply Company of the Supply and Transportation Battalion for LHX units are determined based upon 500 rounds fired per mission, eight air-to-air missiles for each aircraft, and four Hellfire missiles for SCAT aircraft.

Interactive Parameters

1. All repairers above the AHC will work 12-hour shifts.

2. The direct maintenance time allowed per individual is 3.4 hours per 12-hour shift.

3. The indirect maintenance time expected per individual is 2.5 hours per 12-hour shift.

4. The time required per individual to perform other tasks is 6.1 hours per shift.

5. There is no time associated with an individual going to the tub file to obtain a work order.

6. If a repairer cannot get a supply part needed from the PLL stock, he will only wait for the part if the expected time to get the part is <=1.25 hours. (The expected time of the shortest possible maintenance action-troubleshooting and round trip travel.)

7. .5 hours will be allowed for an individual to travel to and from a higher level of maintenance in order to get a repair part.

8. The expected time to perform the actual repair of the aircraft once the parts needed are available is 1.0 hour and is subdivided into .25 hour for troubleshooting and .75 hour for repair.

9. It will take .5 hour to take an aircraft to or from a higher level of maintenance.

10. It will take .9563 hour for the technical inspector to inspect each repair. This figure was derived in the following manner:

    MTBMAF=4.5 hours
    Amount of repairs inspected by TI=80%
    Rate of work for TI= .17 MMH/FH

    $$\frac{4.5\text{FH}}{.8\text{ failures}} \times \frac{.17\text{MMH}}{\text{FH}} = .9563\text{ MMH/failure}$$

11. The float account will contain two aircraft.

12. The numbers and types of MOS used for repairs generated by the simulation are as follows:

MOS	AHC	HSC	ART	HHT	AMC
66J	0	1	0	1	1
66(1)	0	7	0	5	8
67(2)	11	15	10	10	37
68(3)	0	4	0	2	11
68(4)	0	9	0	8	12
68G	0	3	0	2	4
68H	0	0	0	0	3
68K	0	1	0	1	1
35(5)	0	9	0	3	15

13. The percentage of repair performed by each of the following MOS above the UNIT is as follows:

MOS	UTILITY	SCAT
66J	Inspects all repairs performed by 68(4)	
66(1)	Inspects all other repairs	
67(2)	.042	.098
68(3)	.240	.166
68(4)	.224	.332
68G	.135	.104
68H	.045	.031
68K	.090	.072
35(5)	.224	.197

14. The numbers and types of supply MOS are as follows:

MOS	Class III/V Platoon	FSC S&T BN	AMC
55B	25	8	0
76P	0	0	2
76V	0	0	6
77F(76W)*	42	7	0

*76W was rescinded in AR 611-201; April 1986

APPENDIX B
FUNCTIONAL FLOW DIAGRAMS

Included in this appendix are the functional flow diagrams of the mission and maintenance simulation module. There are two distinct sequences of events; one pertaining to the events and times associated with the aircraft and the second pertaining to the events and times associated with the personnel. The tub file serves as the link between the two in that all functions to be performed on an aircraft are recorded and stored in the tub file in priority sequence. Subsequent to reporting for duty, the individuals obtain their work orders from the tub file according to the established priorities.

The operation and decision blocks are annotated when applicable with the probability of a yes or no answer, the duration of the operation, and the category of the time. The possible categories for aircraft are "mission capable," "not mission capable supply," "not mission capable maintenance," and "mission capable but not available." The categories for personnel are "direct maintenance," "indirect maintenance," and "other."

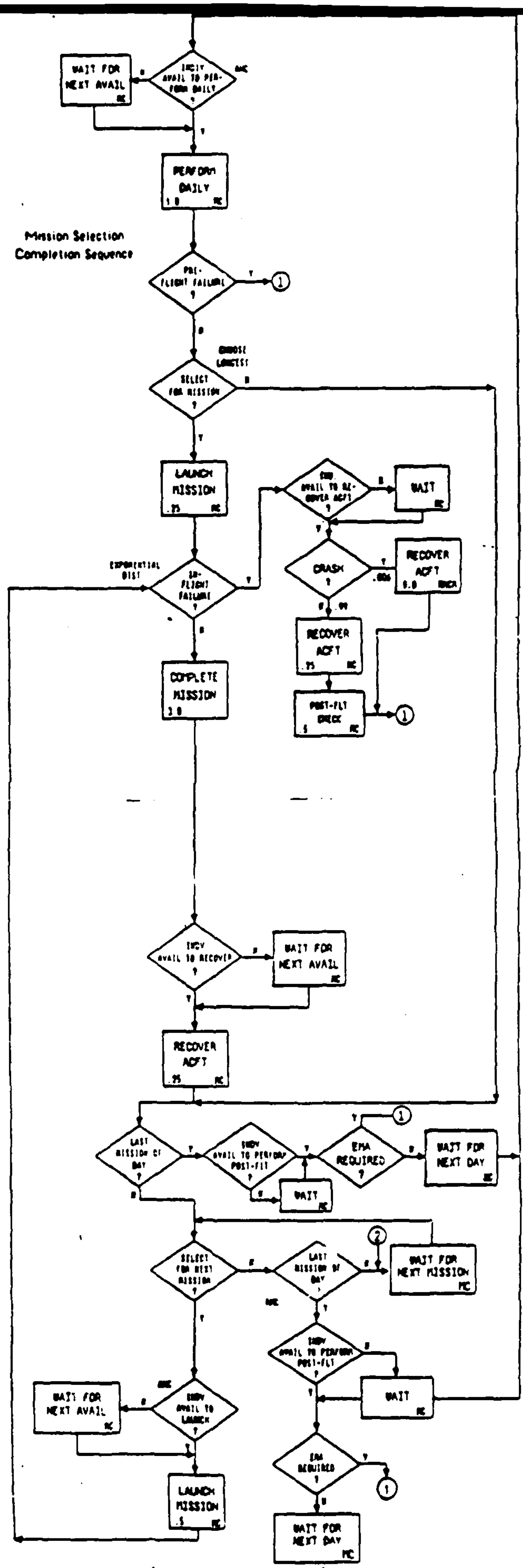


Figure B-2. Mission selection completion sequence.

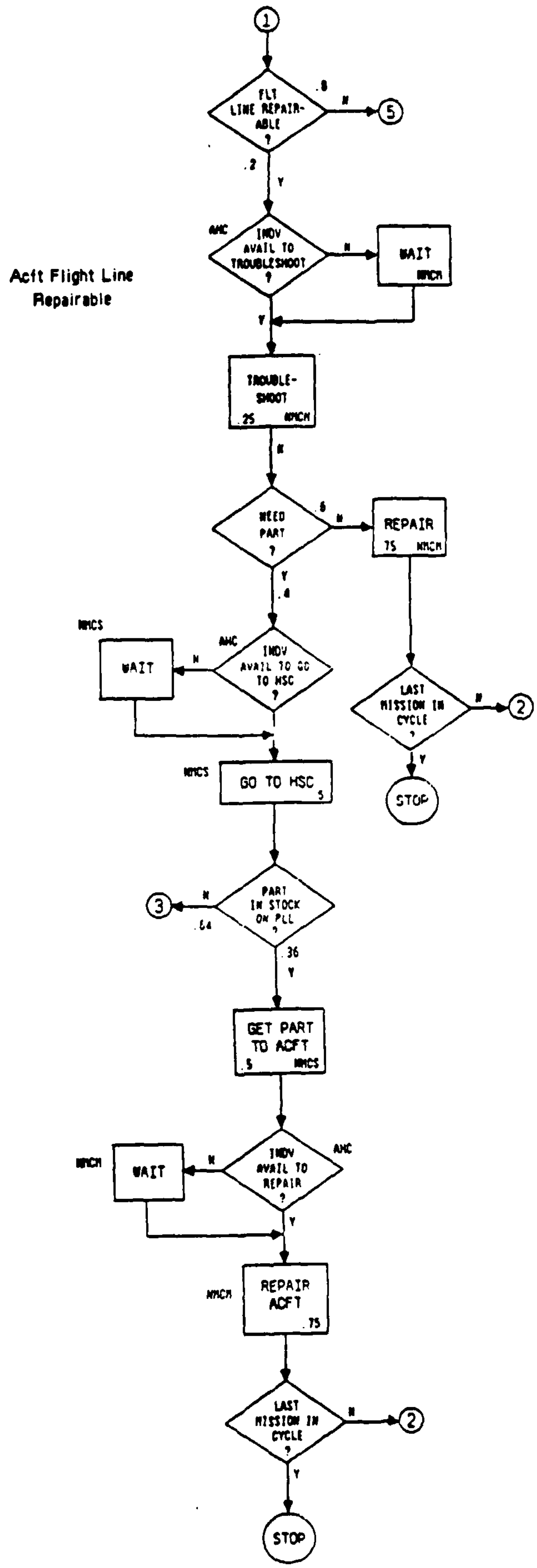


Figure B-3. Aircraft flight line repairable.

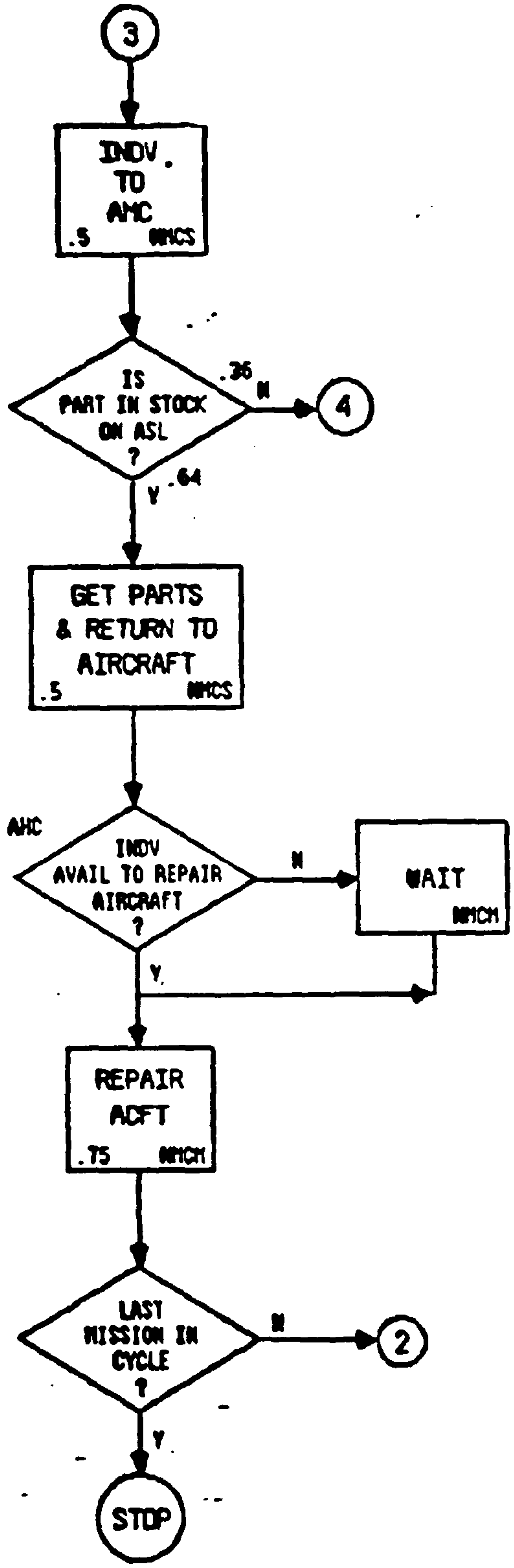


Figure B-4. Part from AMC (aircraft is flight line repairable).

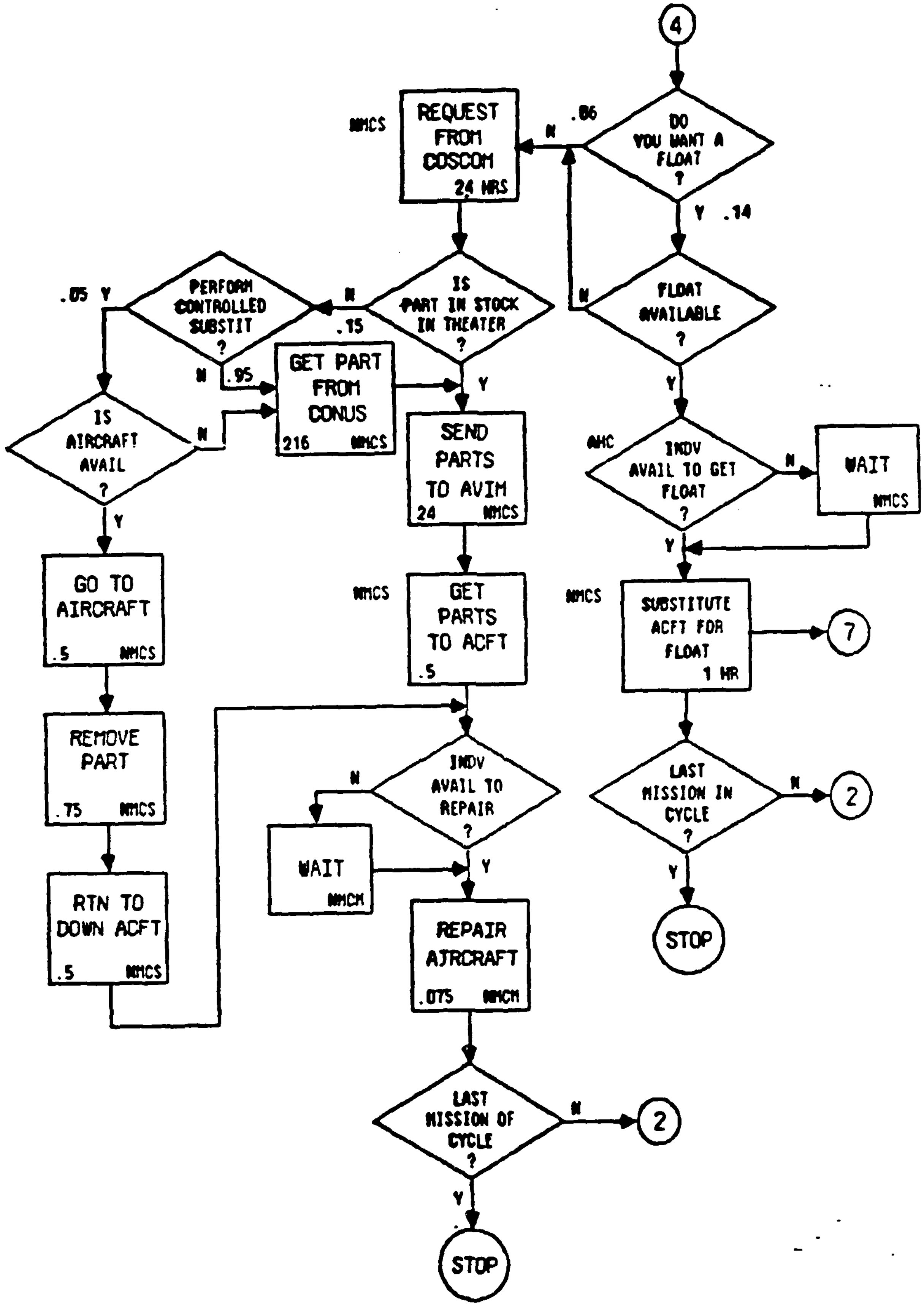


Figure B-5. Float (aircraft is flight line repairable).

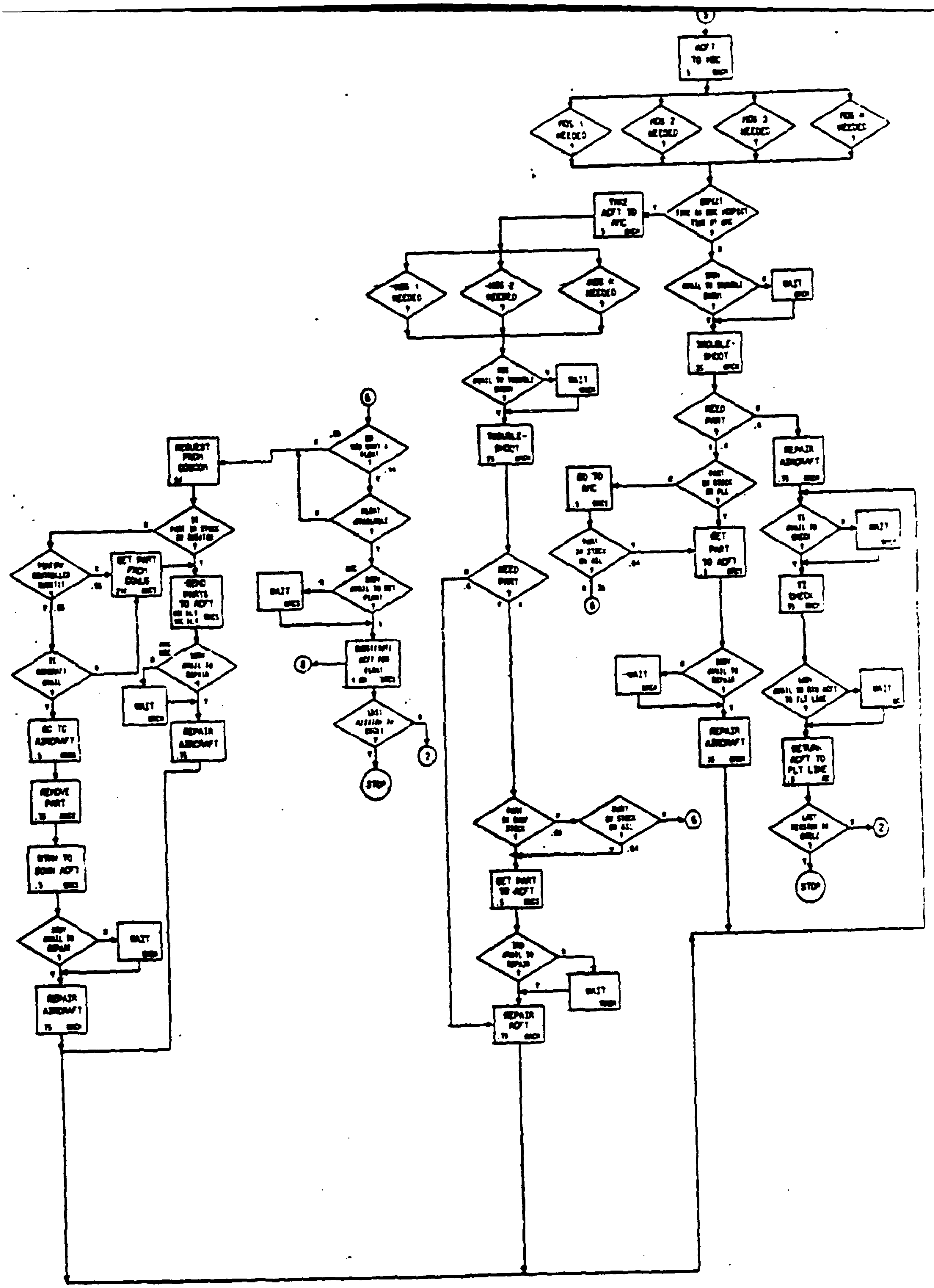


Figure B-6. Aircraft to HSC and AMC

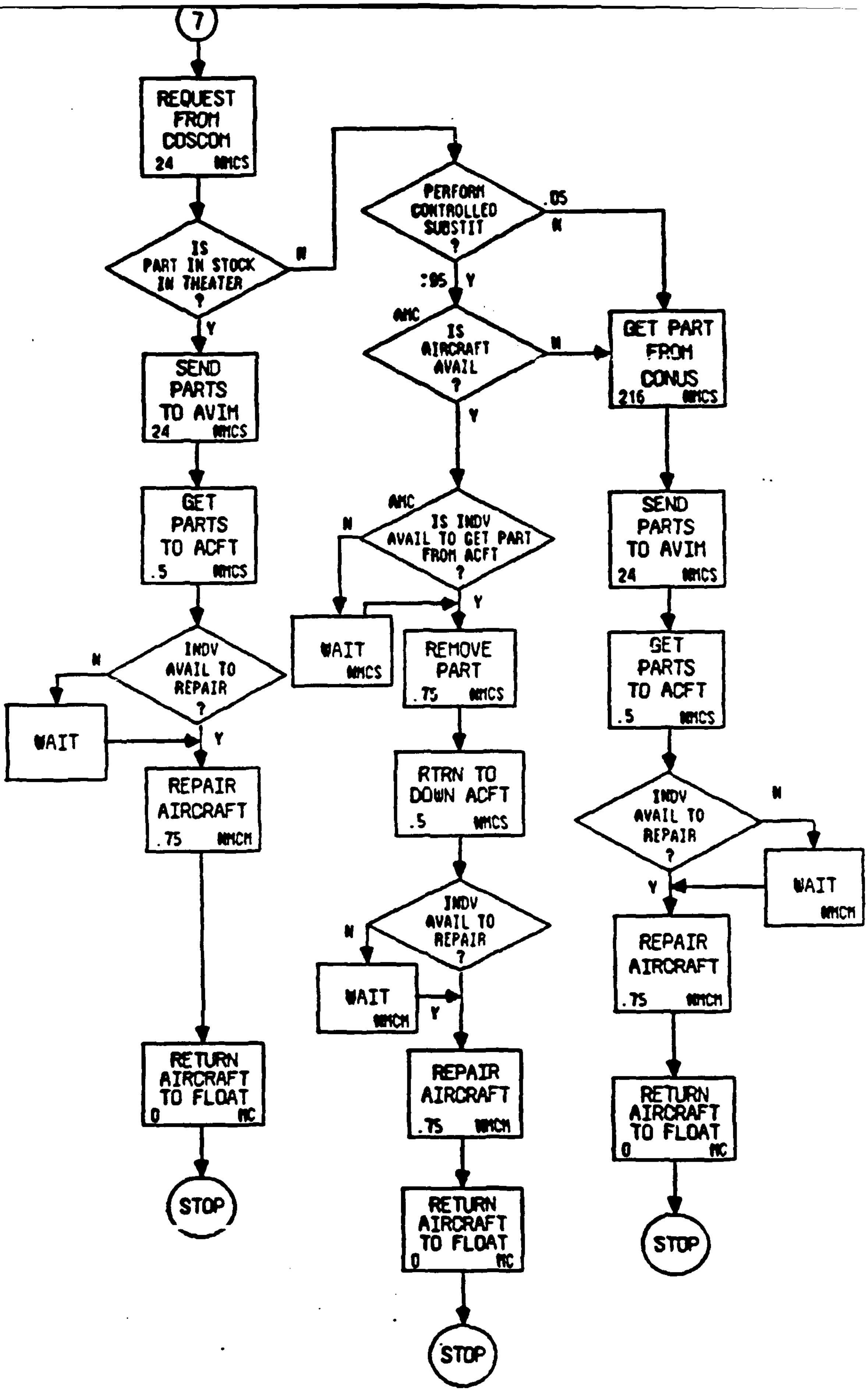


Figure B-7. Repair of float aircraft at AHC.

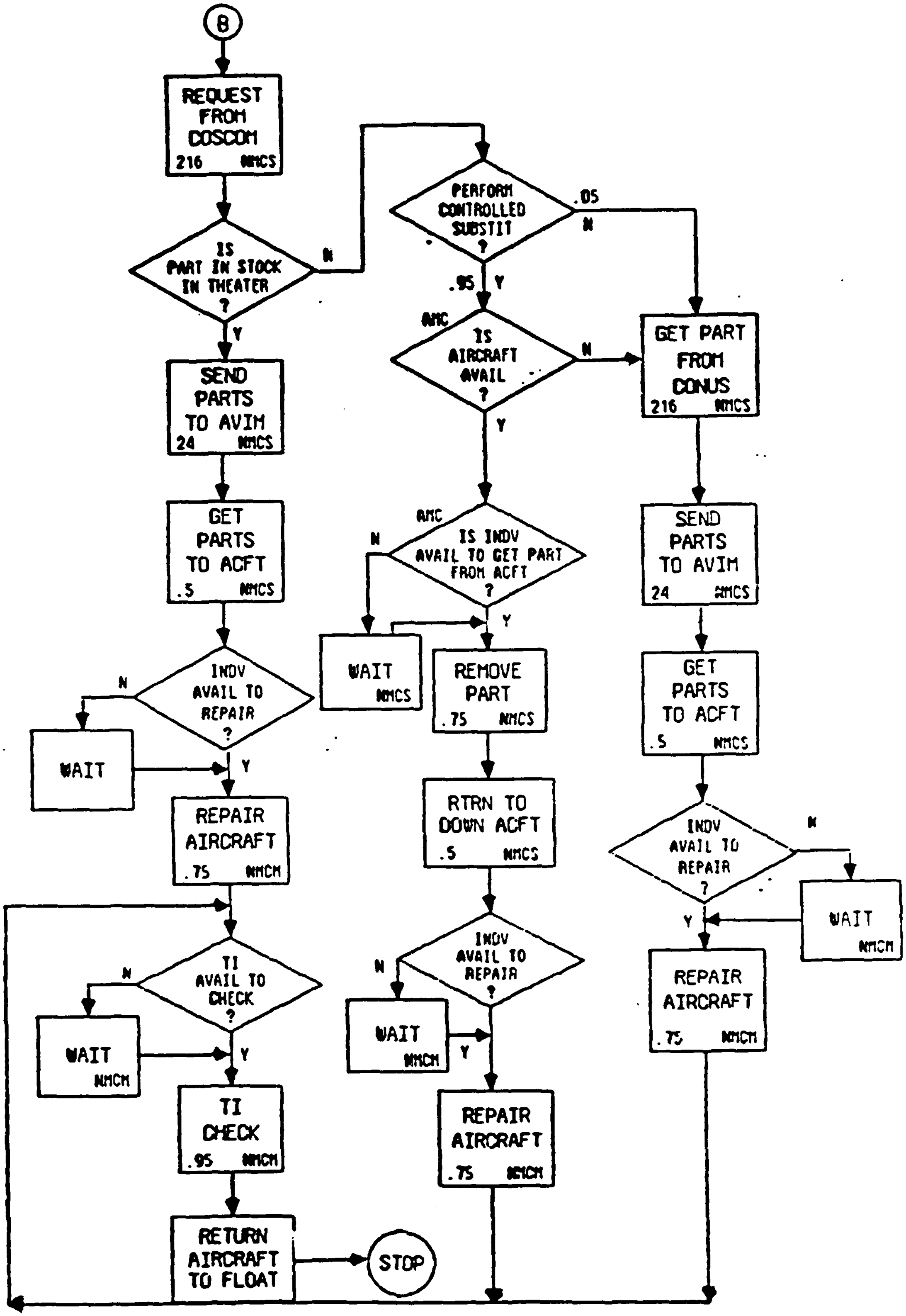


Figure B-8. Repair of float aircraft at HSC or AMC.

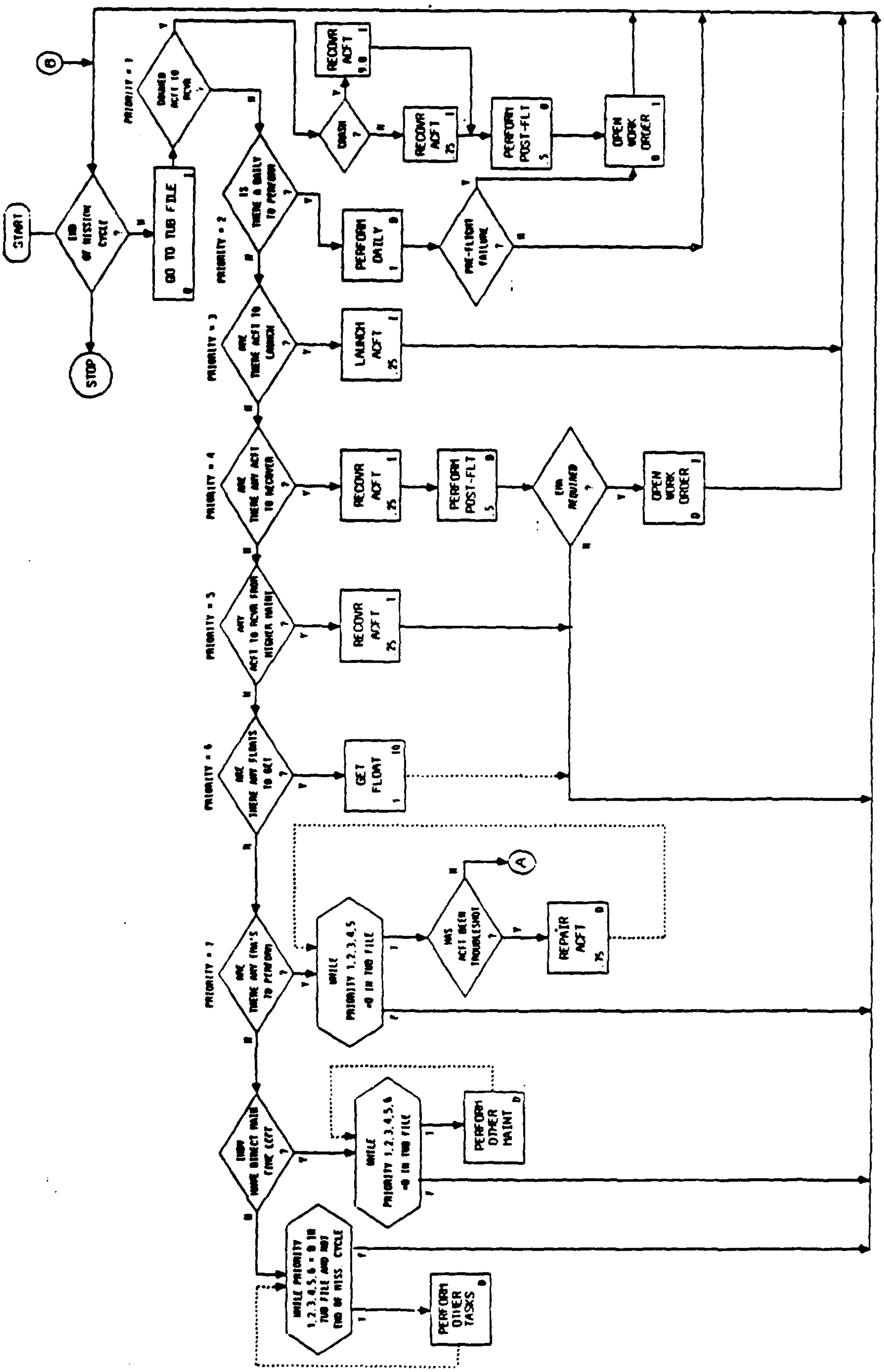


Figure B-9. Individual at AHC.

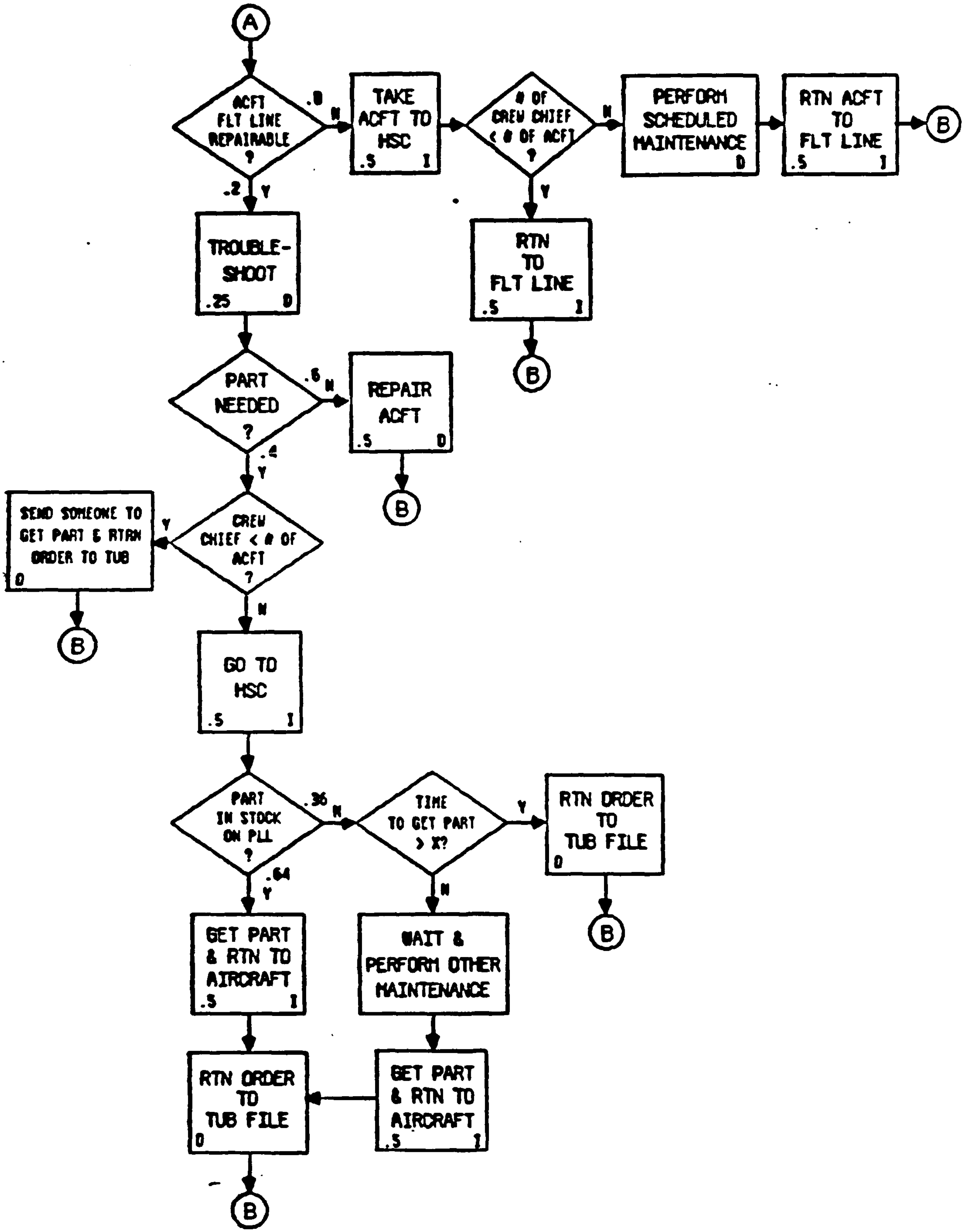


Figure B-10. Individual at AHC (sheet 2).

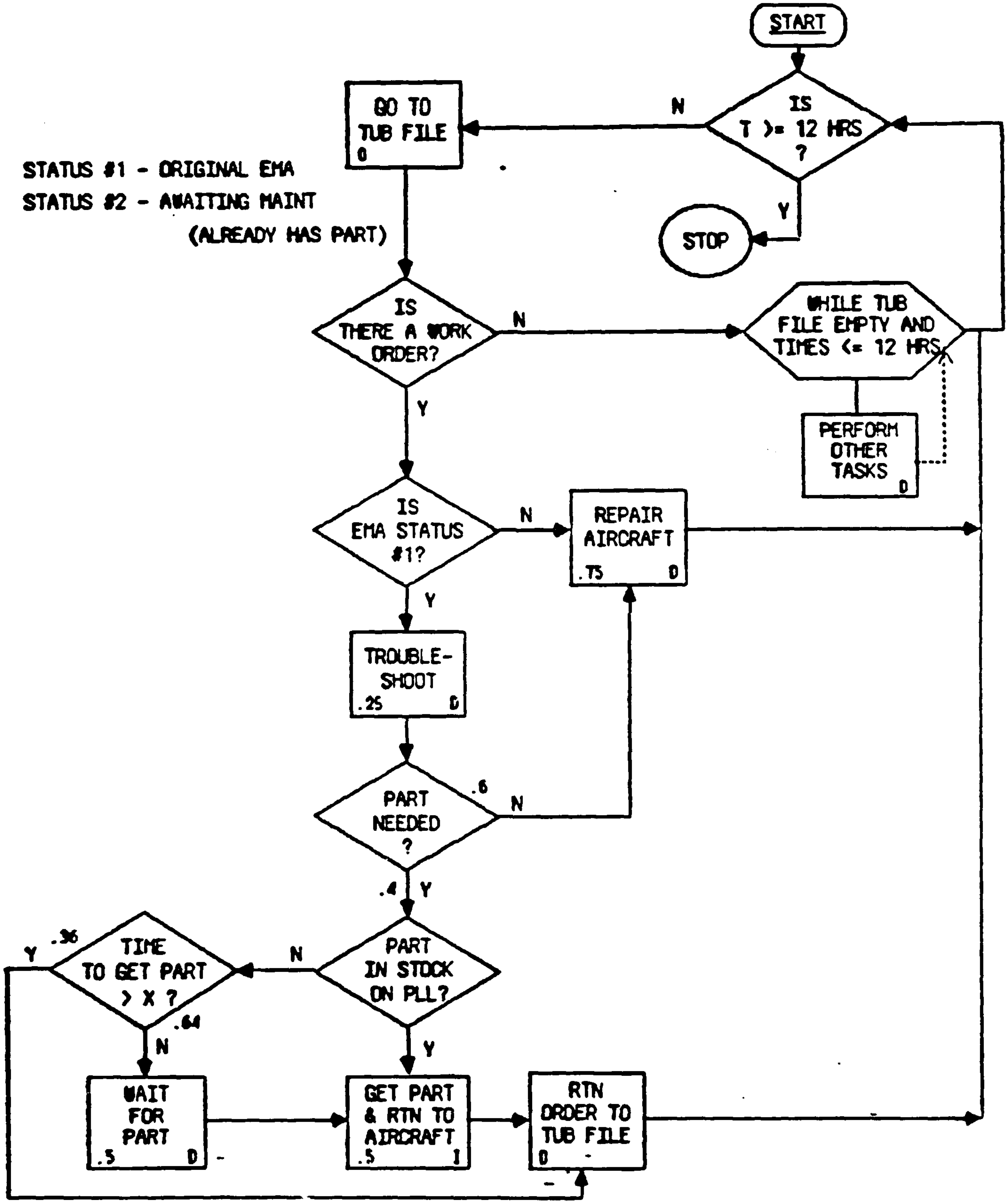


Figure B-11. Indiviual at HSC.

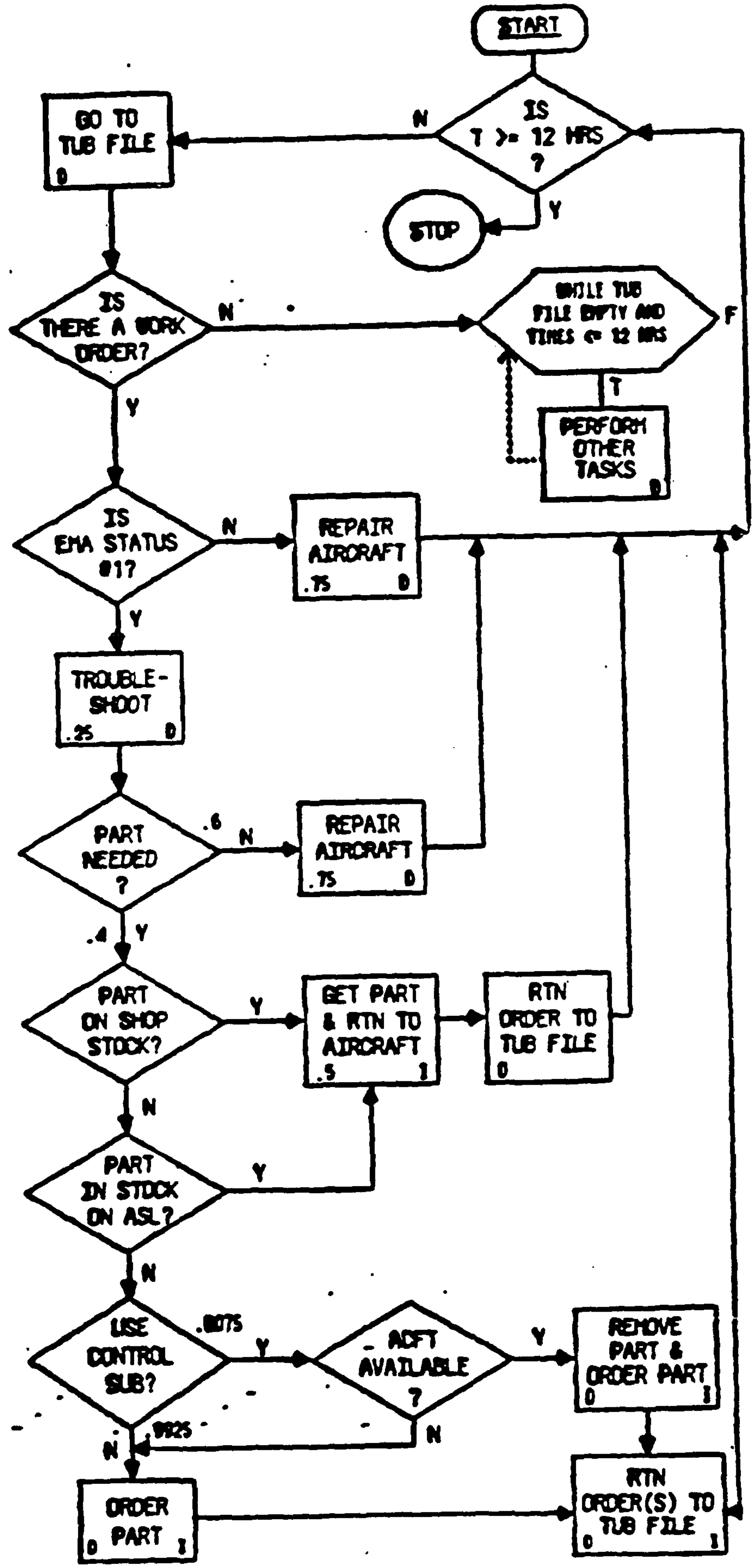


Figure B-12. Individual at AMC.

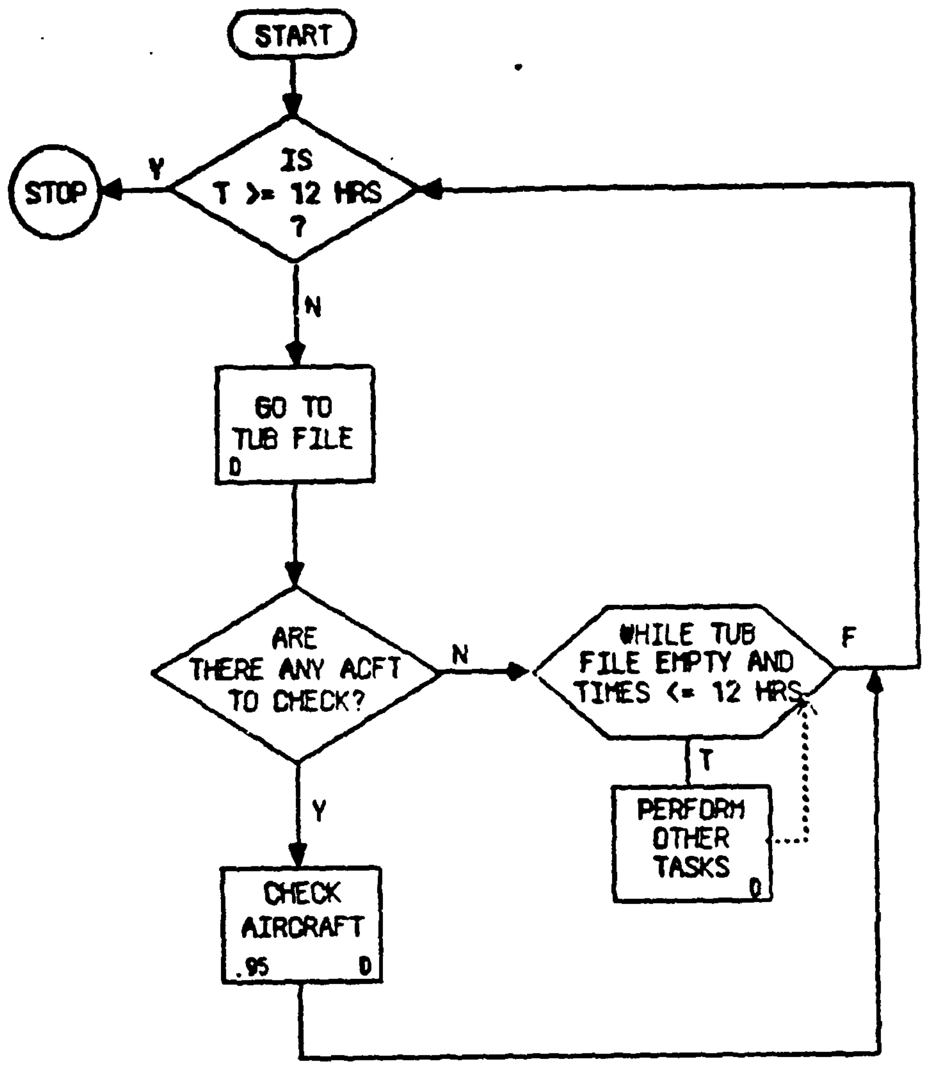


Figure B-13. Technical inspector.

Appendix C
MACRIT Conversion

In order to compute the supply manpower required for the LHX, it was necessary to convert the MACRIT unit of work from lines of supply to requisitions processed per day. The formulas used were

1. summation (stockage level x number of lines stocked at that level x requisitions in 180 days to support that stockage level) / 180 days = requisitions per day

2. number of requisitions per day / the sum of the lines stocked = requisitions per line per day

3. requisitions per line per day x lines per day per man = requisition per day per man.

The sources of data for the above calculations were as follows:

Stockage levels - SESAME.

Number of requisitions required to support a given number of lines at the PLL - Table 8-4, DA PAM 710-2.

Number of requisitions required to support a given stockage level at the ASL - Table G-20, DA PAM 710-2, using the order ship times stipulated in the RAM rationale, a 30-day stockage level and a 5-day safety level.

Lines per day per man - MACRIT.

In the absence of more precise data, the stockage levels produced by SESAME were used in the calculations. Tables 1 through 4 below show the supply data used for each location.

Table 1

<u>Attack</u>

Stockage Levels	Lines @ level	Req in 180 days	Total Req
1	44	1	44
2	23	18	414
3	11	30	330
4	5	42	210
5	1	53	53
9	3	100	300
	87		1351= total req 180 days

Table 2

<u>Recon</u>

Stockage Levels	Lines @ level	Req in 180 days	Total Req
1	60	1	60
2	14	18	252
3	6	30	180
4	1	42	42
6	1	65	65
7	2	77	154
	84		753= total req 180 days

Table 3

Utility

Stockage Levels	Lines @ level	Req in 180 days	Total Req
1	56	1	56
2	5	18	90
3	1	30	30
4	2	42	84
	64		260= total req 180 days

Table 4

ASL

Stockage Levels	Lines @ level	Req in 360 days*	Total Req
1	53	3	159
2	29	13	377
3	6	24	144
4	6	25	150
6	4	37	148
	98		978= total req 360 days

APPENDIX D
OUTPUT DATA

The raw data for each of the cases run are included in this appendix.

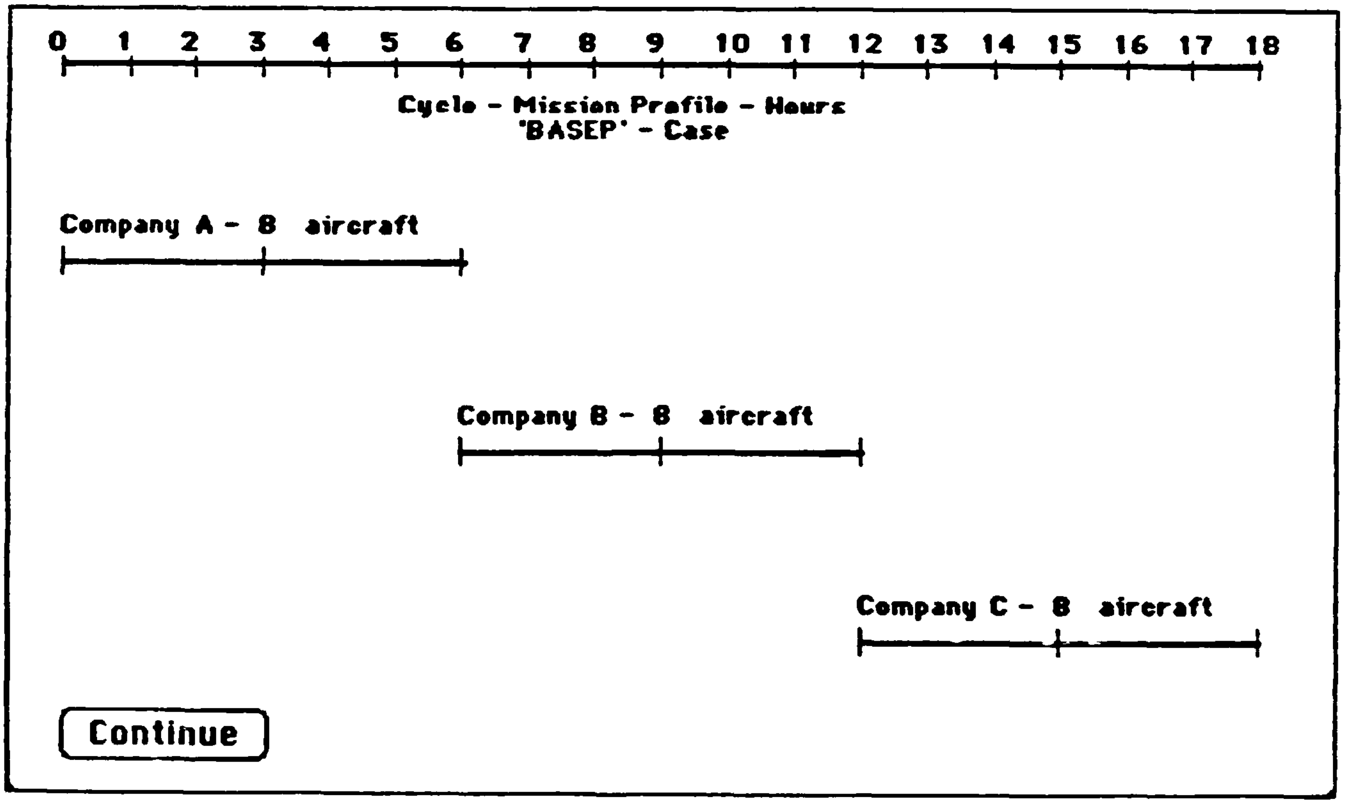
The data are grouped according to case and operating organization and include the following:

1. Display of initiating inputs.
2. Diagram of mission scenario.
3. List of activities for which delays awaiting personnel are being experienced.
4. Graphic display of mission accomplishment.
5. List of time spent in the various repair categories.
6. Overhead (Bn Commander's) and float aircraft utilization record.
7. Record of count of maintenance events by location and repair parts source.
8. Record of the duration of maintenance events by location and repair parts source.
9. Record of mission performance by count of aircraft starting and completing missions.
10. Record of mission performance by hours flown per aircraft by number of aircraft launched.
11. Record of time spent awaiting personnel by MOS, by location.
12. Record of time spent performing maintenance functions on mission capable aircraft by MOS, by location.
13. Record of time spent performing maintenance functions on aircraft in a not mission capable maintenance status by MOS, by location.
14. Record of man-hour expenditures performing indirect maintenance functions for aircraft in a non-mission capable supply status by MOS, by location.
15. Projection of required strengths by MOS, by location, by shift.

DivAirPRun apl

Review or change availability and demand factors for case 'BASEP'

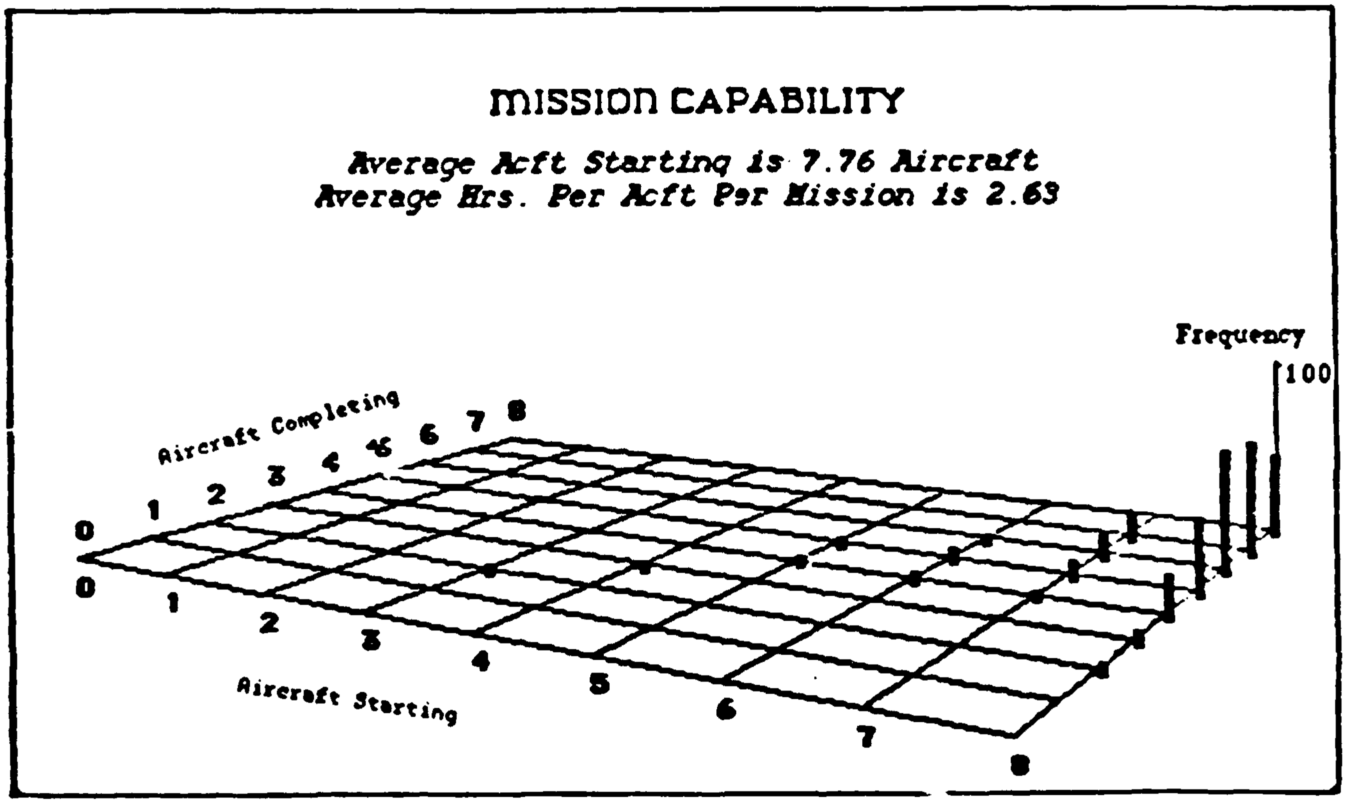
MTBEMA = 4.5 hrs	MTBMAF = 8.4 hrs
MTTR = 1 hrs	Cycle Length = 18 hrs
Msn Length = 3 hrs	Msn/Co/Cyc = 2
Msn Interval = 0 hrs	Aircraft/Mission = 8
Float Aircraft = 2	Comp per Cyc = 3
SubCycles = 1	



BASE CASE - ATTACK
(12 Replications of 4 cycles)
(288 Missions)

Division Aircraft Organization Capability Model - BASEP - 06-08-1987 - 15:34:57
Aircraft Hours per Day Delayed in Various Operations

Operational Category	Down Time
Downed A/C	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.042
Troubleshoot	0.195
Inspect	0.708



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft completing = The number of aircraft performing an entire 3 hr. mission.
Frequency = The number of missions with the configuration indicated by the intersection of the aircraft starting and aircraft completing axes.

BASE CASE - ATTACK

Division Aircraft Organization Capability Model - BASEP - 06-08-1987 - 15:36:50
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Parts Time
On Flight Line	1.273	0.000
Flt Line to HSC	0.486	0.000
At HSC	4.183	0.423
HSC to AMC	0.289	0.000
At AMC	4.569	0.522
AMC to Flt Line	0.258	0.000
HSC to Flt Line	0.164	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	9.00001E-03
Float Available	9.00001E-03
NMCS (PLL clerk)	.26

Aircraft Repair Frequency Count
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	171	267	382	820	62.8
PLL/Shp Stk	59	83	126	268	20.5
ASL	17	31	68	116	8.9
Float	3		11	14	1.1
Theater	10	22	36	68	5.2
Cont Sub		3	2	5	0.4
CONUS		9	6	15	1.1
Total	260	415	631	1306	
Percent	19.9	31.8	48.3	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.3	3.2	3.4
PLL/Shp Stk	2.0	3.4	3.9
ASL	2.5	3.9	4.1
Float	72.0		28.5
Theater	48.9	47.2	44.2
Cont Sub		27.3	28.9
CONUS		265.2	265.7

Mission Frequency Count - BASEP
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8	Tot	Pct	Cum Rtn	Cu Pc
8	-	-	-	-	-	-	-	-	44	44	15.3	44	15.
7	-	-	-	-	-	-	-	13	63	76	26.4	120	41.
6	-	-	-	-	-	-	2	10	67	79	27.4	199	69.
5	-	-	-	-	-	1	4	8	40	53	18.4	252	87.
4	-	-	-	-	-	2	3	2	20	27	9.4	279	96.
3	-	-	-	-	1	-	-	-	4	5	1.7	284	98.
2	-	-	-	1	-	-	-	-	3	4	1.4	288	100.
1	-	-	-	-	-	-	-	-	-	0	0.0	288	100.
0	-	-	-	-	-	-	-	-	-	0	0.0	288	100.
Total	0	0	0	1	1	3	9	33	241	288			
Percent	0.0	0.0	0.0	0.3	0.3	1.0	3.1	11.5	83.7	100			
Cum Rtn	288	288	288	288	287	286	283	274	241				
Cum Pct	100	100	100	100	99.7	99.3	98.3	95.1	83.7				

Composite Mission Times
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8
8	-	-	-	-	-	-	-	-	3.0
7	-	-	-	-	-	-	-	3.0	2.7
6	-	-	-	-	-	-	3.0	2.7	2.6
5	-	-	-	-	-	3.0	2.6	2.4	2.4
4	-	-	-	-	-	2.5	2.2	2.3	2.2
3	-	-	-	-	2.4	-	-	-	2.0
2	-	-	-	2.0	-	-	-	-	1.8
1	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-

Average is 2.63

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

C-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	9.46
66(1)	4	3	0.07
67(2)	8	7	0.00
68(3)	2	2	0.08
68(4)	5	4	0.02
68G	2	1	0.25
68H	0	0	0.00
68K	1	0	4.09
35(5)	5	4	0.00

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	13.64
66(1)	4	4	0.39
67(2)	19	18	0.00
68(3)	6	5	0.03
68(4)	6	5	0.00
68G	2	2	0.05
68H	2	1	0.45
68K	1	0	2.65
35(5)	8	7	0.00

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.03

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.05

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.03

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	3	.1
67(2)	8	7	0
68(3)	2	2	0
68(4)	5	4	0
68G	2	1	0
68H	0	0	0
68K	1	0	0
35(5)	5	4	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.03
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.99

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	1

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.98

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	4.03
66(1)	4	3	.97
67(2)	8	7	.1
68(3)	2	2	.8
68(4)	5	4	.78
68G	2	1	.76
68H	0	0	0
68K	1	0	1.53
35(5)	5	4	.46

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	4.51
66(1)	4	4	1.49
67(2)	19	18	.09
68(3)	6	5	.61
68(4)	6	6	.66
68G	2	2	.8
68H	2	1	.66
68K	1	0	1.24
35(5)	8	7	.37

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.05

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.06

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.06

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	3	0
67(2)	8	7	0
68(3)	2	2	0
68(4)	5	4	0
68G	2	1	0
68H	0	0	0
68K	1	0	0
35(5)	5	4	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

Division Aircraft Organization Capability Model - BASEP - 06-10-1987 - 17:24:22
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 11 11 11

MOS	Wkld/Rqd Str	
67(2)	9.0	9

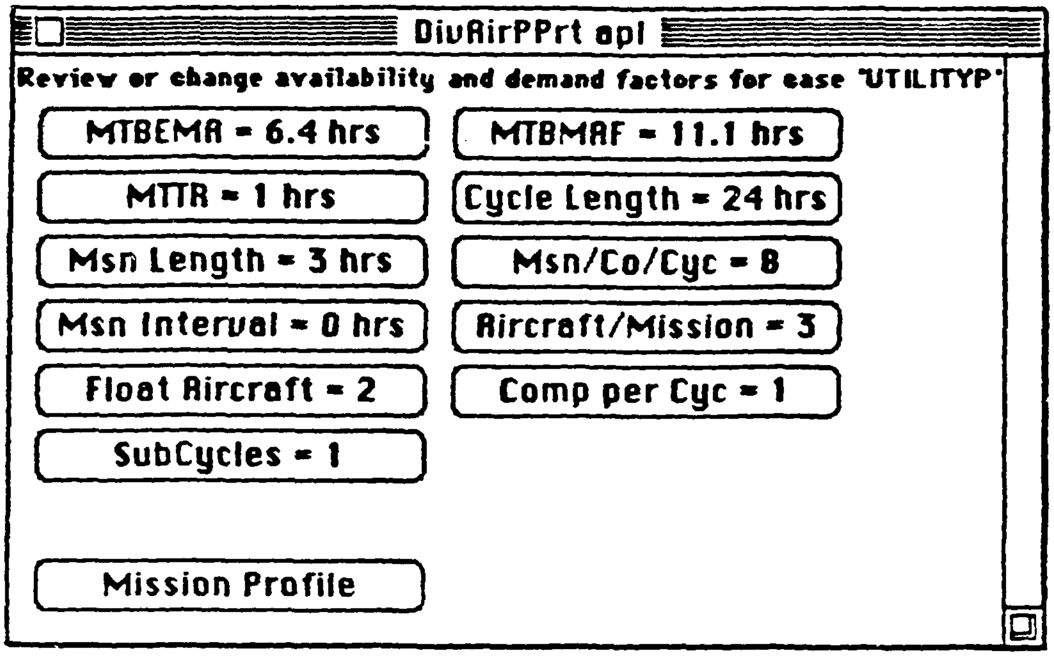
HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

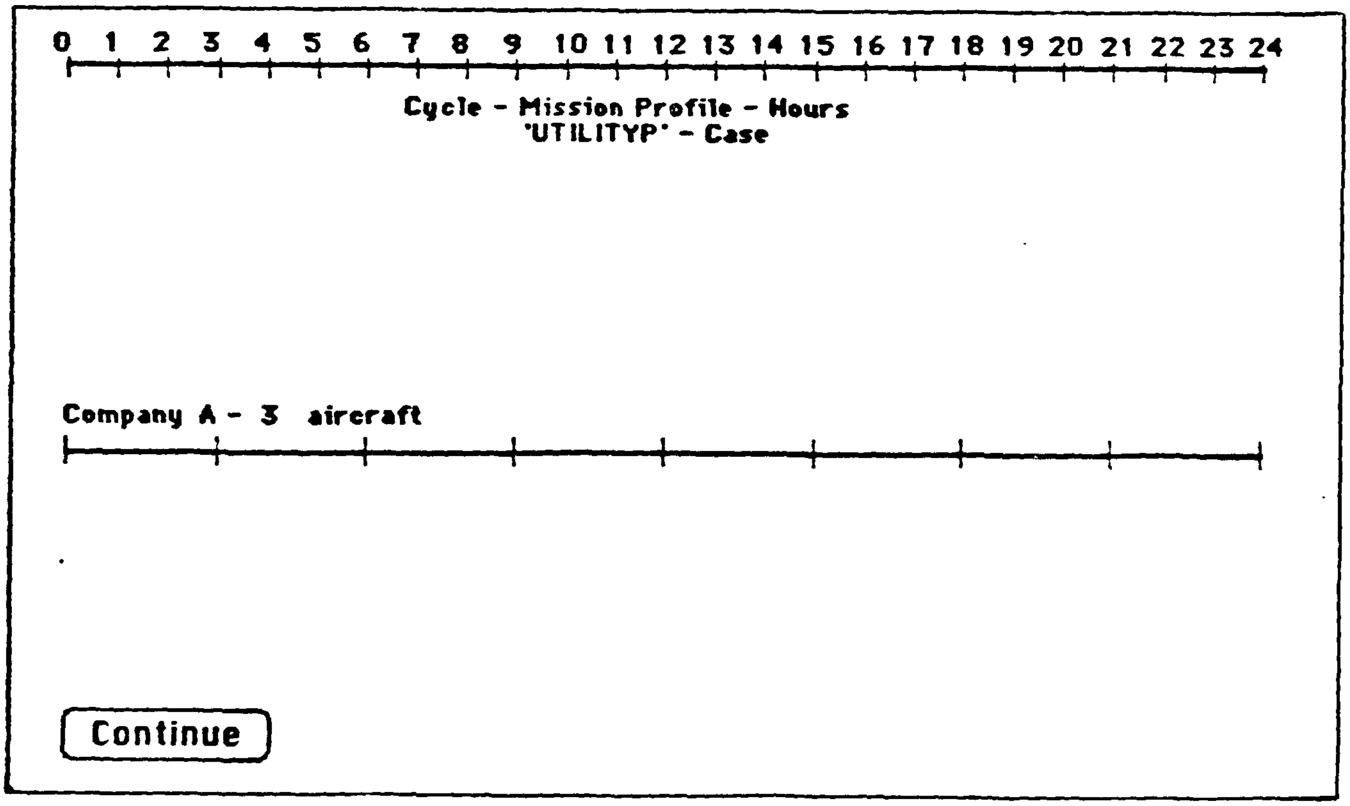
MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	1.2	2
66(1)	4	3	2.2	3
67(2)	8	7	0.4	1
68(3)	2	2	0.9	1
68(4)	5	4	2.1	3
68G	2	1	0.7	1
68H	0	0	0.0	0
68E	1	0	0.5	1
35(5)	5	4	1.2	2

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

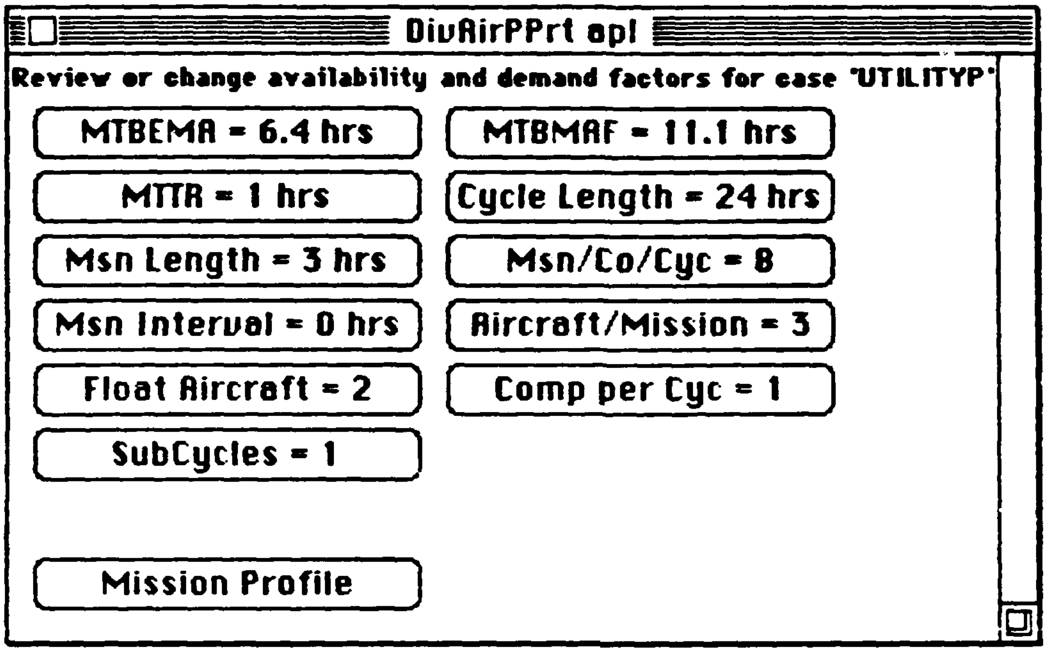
MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	1.3	2
66(1)	4	4	3.5	4
67(2)	19	18	1.3	2
68(3)	6	5	2.0	2
68(4)	6	6	2.3	3
68G	2	2	0.9	1
68H	2	1	0.6	1
68E	1	0	0.4	1
35(5)	8	7	1.5	2

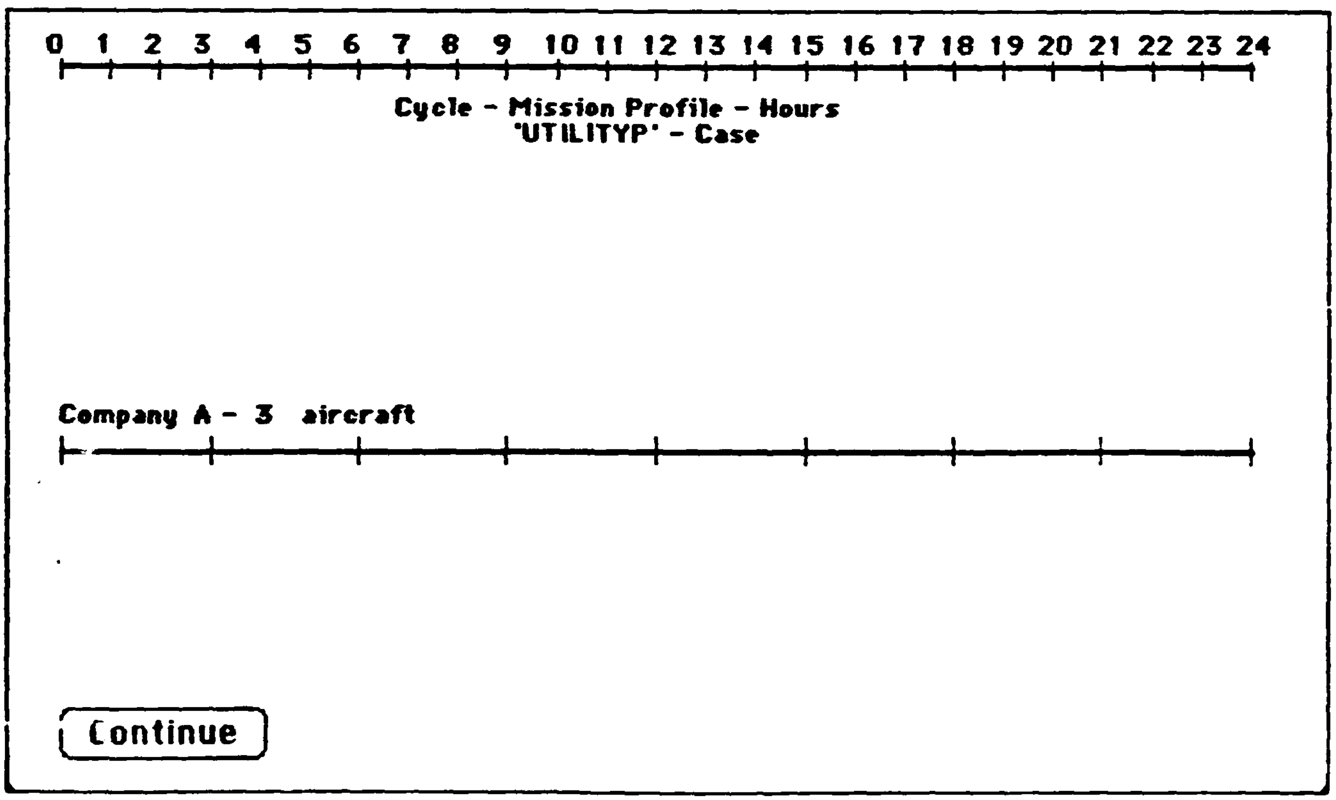
BASE CASE - UTILITY





BASE CASE - UTILITY
(12 Replications of 3 Cycles)
(288 Missions)

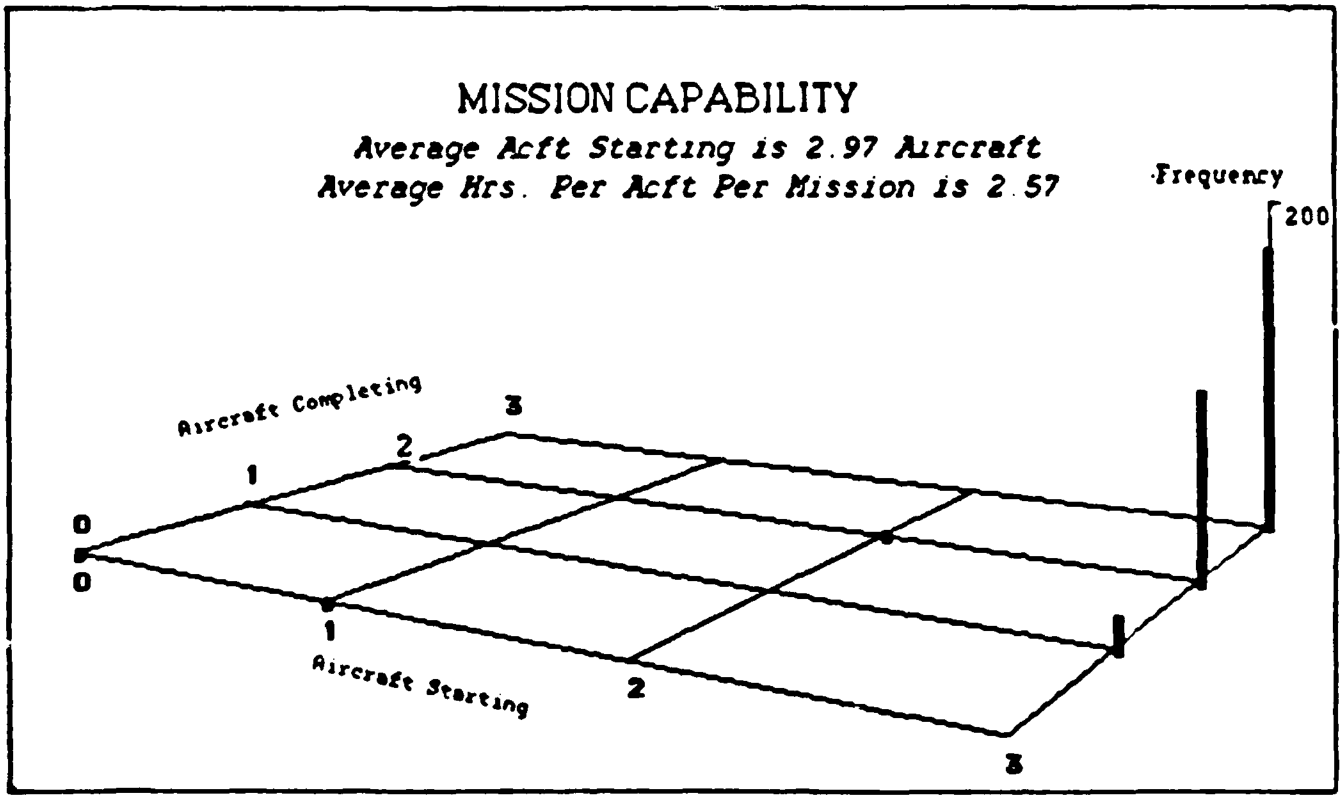




BASE CASE - UTILITY

Division Aircraft Organization Capability Model - UTILITYP - 06-08-1987 - 16:45:08
Aircraft Hours per Day Delayed in Various Operations

Operational Category	Down Time
Downed A/C	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.023
Troubleshoot	0.113
Inspect	0.588



Aircraft Starting = The number of aircraft able to start the mission.

Aircraft Completing = The number of aircraft performing an entire 3 hr. mission

Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

BASE CASE - UTILITY

Division Aircraft Organization Capability Model - UTILITYP - 06-08-1987 - 16:47:36
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	2.632	0.000
Flt Line to HSC	0.000	0.000
At HSC	0.000	0.000
HSC to AMC	0.444	0.000
At AMC	10.693	0.725
AMC to Flt Line	0.380	0.000
HSC to Flt Line	0.000	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.019
Float Available	.019
NMCS (PLL clerk)	.28

Aircraft Repair Frequency Count
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	30	2	88	120	54.5
PLL/Shp Stk	12		42	54	24.5
ASL	3		17	20	9.1
Float	1		3	4	1.8
Theater	1		16	17	7.7
Cont Sub	1			1	0.5
CONUS	1		3	4	1.8
Total	49	2	169	220	
Percent	22.3	0.9	76.8	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4	2.7	3.3
PLL/Shp Stk	1.5		3.9
ASL	2.0		4.3
Float	27.2		26.9
Theater	48.8		43.2
Cont Sub	25.2		
CONUS	264.8		264.8

BASE CASE - UTILITY

Mission Frequency Count - UTILITYP
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	Tot	Pct	Cum Rtn	Cum Pct
3	-	-	-	164	164	56.9	164	56.9
2	-	-	2	104	106	36.8	270	93.8
1	-	-	-	15	15	5.2	285	99.0
0	2	1	-	-	3	1.0	288	100.0
Total	2	1	2	283	288			
Percent	0.7	0.3	0.7	98.3	100			
Cum Rtn	288	286	285	283				
Cum Pct	100	99.3	99.0	98.3				

Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3
3	-	-	-	3.0
2	-	-	3.0	2.1
1	-	-	-	1.6
0	-	-	-	-

Average is 2.57

BASE CASE - UTILITY

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	6	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

C-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0.00
66(1)	1	0	0.00
67(2)	6	0	0.00
68(3)	0	0	0.00
68(4)	0	0	0.00
68G	0	0	0.00
68H	0	0	0.00
68K	0	0	0.00
35(5)	0	0	0.00

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	3.53
66(1)	4	4	0.00
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.00
68G	2	2	0.00
68H	2	1	0.04
68K	1	0	0.78
35(5)	8	7	0.00

BASE CASE - UTILITY

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	6	4.54

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	.67
67(2)	6	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

BASE CASE - UTILITY

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	6	.62

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	.05
67(2)	6	0	.02
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	1.46
66(1)	4	4	.35
67(2)	19	18	.02
68(3)	6	5	.12
68(4)	6	6	.21
68G	2	2	.2
68H	2	1	.1
68K	1	0	.6
35(5)	8	7	.11

BASE CASE - UTILITY

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	6	.04

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	0
67(2)	6	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

BASE CASE - UTILITY

Division Aircraft Organization Capability Model - UTILITYP - 06-10-1987 - 17:28:07
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 6 0 0

MOS	Wkld/Rqd Str	
67(2)	7.0	7

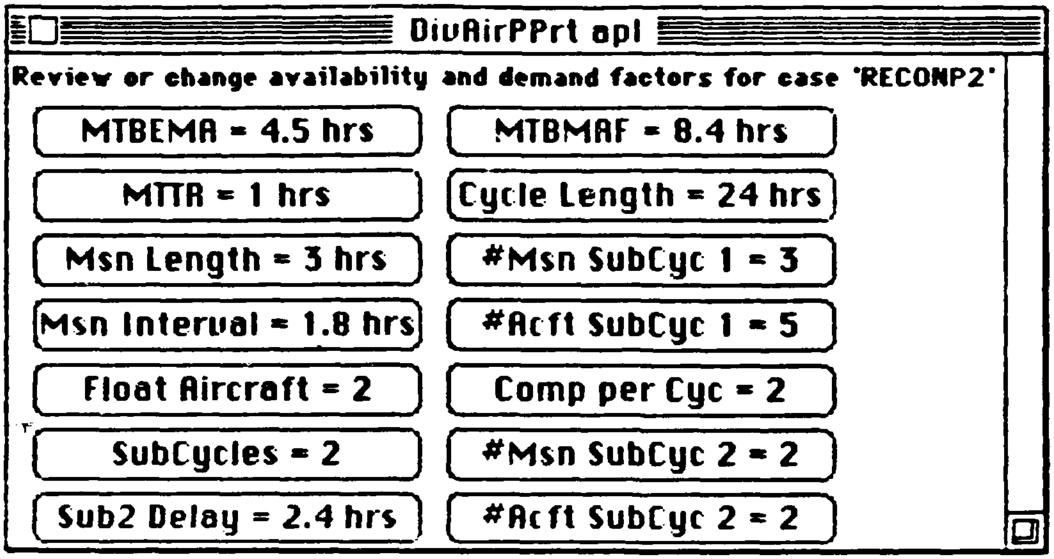
HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

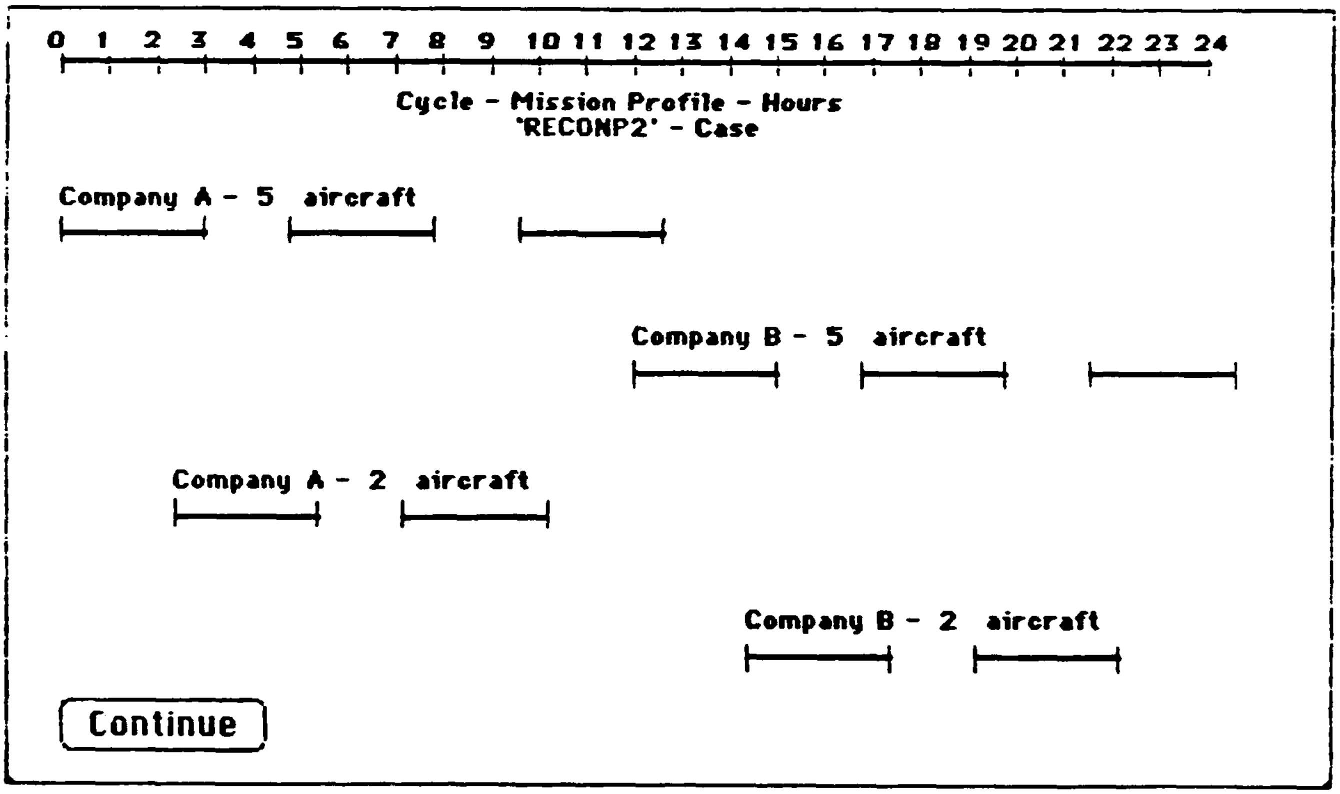
MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	0	0	0.0	0
66(1)	1	0	0.2	1
67(2)	6	0	0.0	0
68(3)	0	0	0.0	0
68(4)	0	0	0.0	0
68G	0	0	0.0	0
68H	0	0	0.0	0
68K	0	0	0.0	0
35(5)	0	0	0.0	0

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	0.4	1
66(1)	4	4	0.8	1
67(2)	19	18	0.6	1
68(3)	6	5	0.4	1
68(4)	6	6	0.7	1
68G	2	2	0.2	1
68H	2	1	0.0	1
68K	1	0	0.2	1
35(5)	8	7	0.5	1

BASE CASE - RECONNAISANCE





BASE CASE - RECONNAISANCE

Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.063
Troubleshoot	0.089
Tech Inspection	0.776

Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5
5	-	-	-	-	-	3.0
4	-	-	-	-	3.0	2.6
3	-	-	-	-	2.9	2.3
2	-	-	-	2.0	-	2.0
1	-	-	-	-	-	1.4
0	-	-	-	-	-	-

Average is 2.63

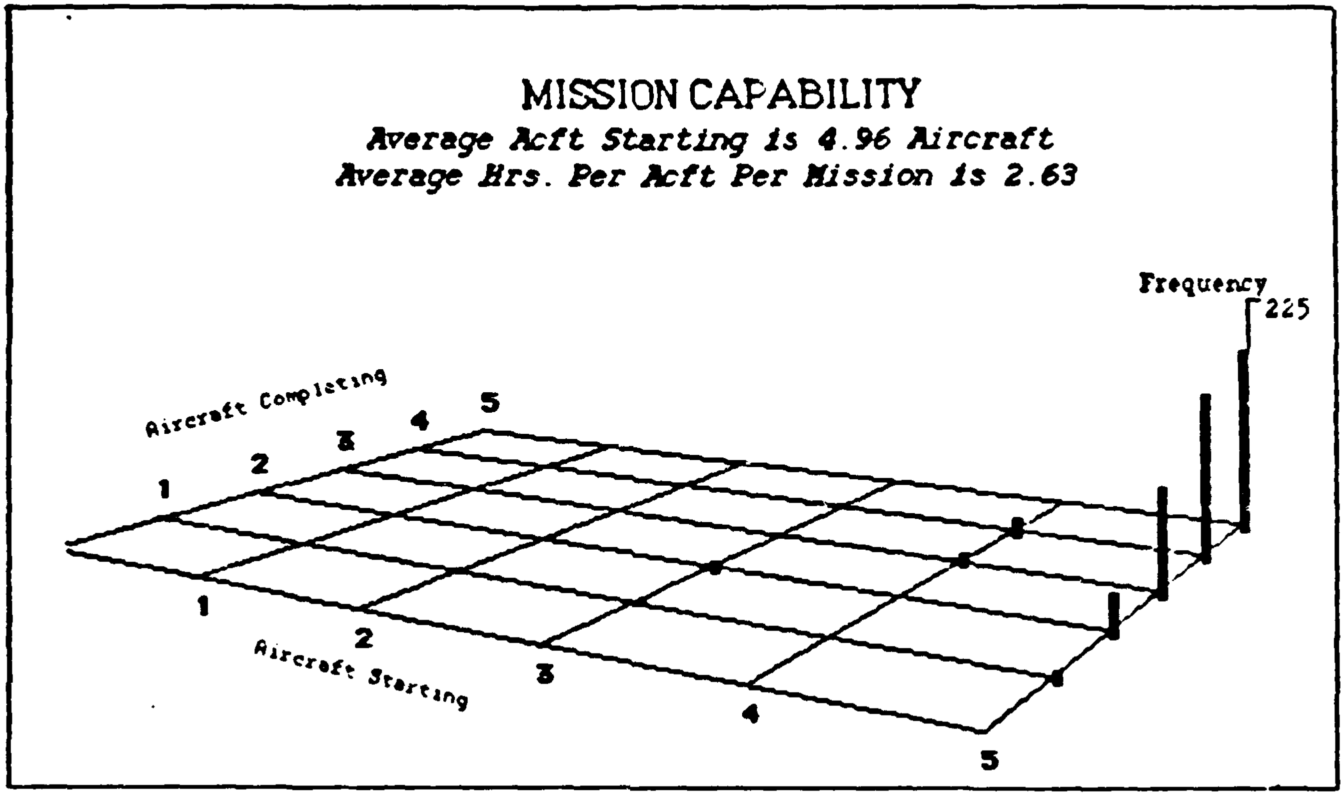
Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to start Mission

Aircraft Completing	0	1	2
2	-	-	3.0
1	-	-	2.0
0	-	-	-

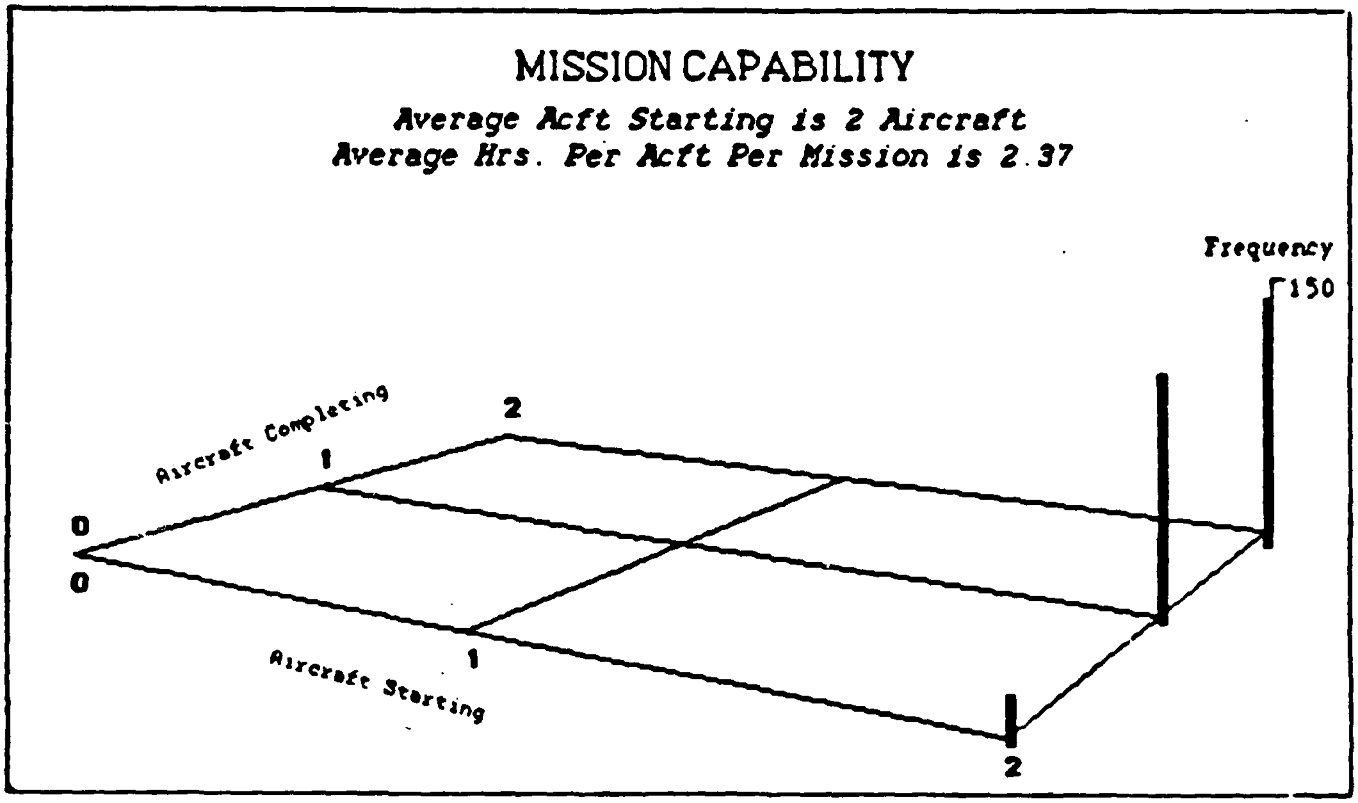
Average is 2.37

BASE CASE - RECONNAISSANCE
(12 Replications of 3 Cycles)
(204 Missions)



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes

BASE CASE - RECONNAISSANCE
(12 Replications of 3 Cycles)
(144 Missions)



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission.
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

BASE CASE - RECONNAISANCE

Division Aircraft Organization Capability Model - RECONP2 - 06-12-1987 - 13:33:13
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	3.769	0.000
Flt Line to HSC	0.394	0.000
At HSC	2.247	0.456
HSC to AMC	0.275	0.000
At AMC	4.253	0.472
AMC to Flt Line	0.256	0.000
HSC to Flt Line	0.095	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.011
Float Available	.011
NMCS (PLL clerk)	.227

Aircraft Repair Frequency Count
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	87	76	231	394	59.2
PLL/Shp Stk	33	36	85	154	23.1
ASL	5	14	29	48	7.2
Float	2		4	6	0.9
Theater	8	14	28	50	7.5
Cont Sub		2	3	5	0.8
CONUS	5	2	2	9	1.4
Total	140	144	382	666	
Percent	21.0	21.6	57.4	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4	2.8	3.8
PLL/Shp Stk	2.0	2.8	4.2
ASL	2.5	3.0	4.4
Float	288.0		75.2
Theater	43.4	42.7	42.9
Cont Sub		28.4	28.3
CONUS	264.8	265.5	266.0

Mission Frequency Count - RECONP2
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	Tot	Pct	Cum Rtn	Cum Pct
5	-	-	-	-	-	76	76	37.3	76	37.3
4	-	-	-	-	4	66	70	34.3	146	71.6
3	-	-	-	-	2	40	42	20.6	188	92.2
2	-	-	-	1	-	13	14	6.9	202	99.0
1	-	-	-	-	-	2	2	1.0	204	100.0
0	-	-	-	-	-	-	0	0.0	204	100.0
Total	0	0	0	1	6	197	204			
Percent	0.0	0.0	0.0	0.5	2.9	96.6	100			
Cum Rtn	204	204	204	204	203	197				
Cum Pct	100	100	100	100	99.5	96.6				

Mission Frequency Count - RECONP2
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	Tot	Pct	Cum Rtn	Cum Pct
2	-	-	72	72	50.0	72	50.0
1	-	-	63	63	43.8	135	93.8
0	-	-	9	9	6.2	144	100.0
Total	0	0	144	144			
Percent	0.0	0.0	100	100			
Cum Rtn	144	144	144				
Cum Pct	100	100	100				

BASE CASE - RECONNAISANCE

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	10	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	10	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	7.19
66(1)	2	3	0.01
67(2)	5	5	0.00
68(3)	1	1	0.14
68(4)	4	4	0.01
68G	1	1	0.19
68H	0	0	0.00
68K	1	0	1.39
35(5)	2	1	0.18

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	8.27
66(1)	4	4	0.04
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.00
68G	2	2	0.00
68H	2	1	0.28
68K	1	0	0.85
35(5)	8	7	0.00

BASE CASE - RECONNAISANCE

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	2.94

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	2.86

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	2	3	.13
67(2)	5	5	0
68(3)	1	1	0
68(4)	4	4	0
68G	1	1	0
68H	0	0	0
68K	1	0	0
35(5)	2	1	0

AHC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

BASE CASE - RECONNAISANCE

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.88

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.79

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	1.96
66(1)	2	3	.39
67(2)	5	5	.06
68(3)	1	1	.26
68(4)	4	4	.44
68G	1	1	.35
68H	0	0	0
68K	1	0	.83
35(5)	2	1	.33

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	2.52
66(1)	4	4	.89
67(2)	19	18	.06
68(3)	6	5	.35
68(4)	6	6	.39
68G	2	2	.41
68H	2	1	.3
68K	1	0	.83
35(5)	8	7	.26

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.07

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.04

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	2	3	0
67(2)	5	5	0
68(3)	1	1	0
68(4)	4	4	0
68G	1	1	0
68H	0	0	0
68K	1	0	0
35(5)	2	1	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

Division Aircraft Organization Capability Model - RECONP2 - 06-12-1987 - 13:39:23
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 10 10 0

MOS	Wkld/Rqd Str	
67(2)	7.7	8

HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	0.6	1
66(1)	2	3	0.8	1
67(2)	5	5	0.2	1
68(3)	1	1	0.2	1
68(4)	4	4	1.0	2
68G	1	1	0.2	1
68H	0	0	0.0	0
68K	1	0	0.2	1
35(5)	2	1	0.3	1

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	0.7	1
66(1)	4	4	2.1	3
67(2)	19	18	1.0	2
68(3)	6	5	1.1	2
68(4)	6	6	1.4	2
68G	2	2	0.5	1
68H	2	1	0.3	1
68K	1	0	0.2	1
35(5)	8	7	1.1	2

CLASS II SUPPLY PERSONNEL REQUIREMENTS-BASE CASE

UNIT TYPE	STOCKAGE LEVEL	LINES/ LEVEL	NO OF REQ	NO. DAYS	TOTAL REQ	SUM OF REQ	SUM OF LINES	REQ/LINE /DAY	WORK LOAD	PARTS REQ FLT LINE	PARTS REQ MSC	TOTAL PARTS	NO PARTS	REQ BY NMCAP	REQ/ DAY	MANPOWER REQ
AT PLL																
ATTACK	1.00	44.00	1.00	100.00	44.00											
	2.00	23.00	18.00	100.00	414.00											
	3.00	11.00	30.00	100.00	330.00											
	4.00	5.00	42.00	100.00	210.00											
	5.00	1.00	53.00	100.00	53.00											
	9.00	3.00	100.00	100.00	300.00	1351.00	87.00	0.09	37.53	89.00	140.00	1306.00	820.00	237.00	6.98	0.18
UTILITY	1.00	56.00	1.00	100.00	56.00											
	2.00	5.00	18.00	100.00	90.00											
	3.00	1.00	30.00	100.00	30.00											
	4.00	2.00	42.00	100.00	84.00	260.00	64.00	0.02	9.82	19.00	0.00	220.00	120.00	19.00	0.53	0.05
RECON	1.00	60.00	1.00	100.00	60.00											
	2.00	14.00	18.00	100.00	252.00											
	3.00	6.00	30.00	100.00	180.00											
	4.00	1.00	42.00	100.00	42.00											
	6.00	1.00	65.00	100.00	65.00											
	7.00	2.00	77.00	100.00	154.00	753.00	84.00	0.05	21.66	53.00	68.00	666.00	394.00	121.00	3.36	0.16
AT ASL																
	1.00	53.00	3.00	360.00	159.00											
	2.00	29.00	13.00	360.00	377.00											
	3.00	6.00	24.00	360.00	144.00											
	4.00	6.00	25.00	360.00	150.00									486.00	13.50	1.12
ATTACK	6.00	4.00	37.00	360.00	148.00	970.00	90.00	0.03	12.06							
UTILITY														100.00	2.78	0.23
RECON														272.00	7.56	0.63

TOTAL MANPOWER REQUIRED
AT DISCOM = 1.98

CLASS V SUPPLY PERSONNEL REQUIREMENTS-BASE CASE

UNIT TYPE	CYCLE LENGTH	MSSN/ DAY	ACFT/ MSSN	MANPOWER REQ @ FARP	ROUNDS /MSSN	WEIGHT/ ROUND	WEIGHT 4 HF	WEIGHT 8 ATAS	TOTAL WEIGHT	WEIGHT/ DAY (TON	ATP CAPACITY	PORTION REQ	MANPOWER REQ
AT FARP													
ATTACK	18.000	2.670	8.000	16.000	500.000	0.750	391.500	223.500	990.100	10.574	275.000	0.038	0.308
UTILITY	24.000	8.000	3.000	6.000	500.000	0.750		223.500	598.500	7.182	275.000	0.026	0.209
RECON	24.000	3.000	5.000	10.000	500.000	0.750	391.600	223.500	990.100	7.426			
RECON	24.000	2.000	2.000		500.000	0.750	391.600	223.500	990.100	1.980			
										9.406	275.000	0.034	0.274

MANPOWER
REQUIRED AT ATP = 0.790

PERSONNEL REQUIREMENTS-PILOTS-BASE CASE

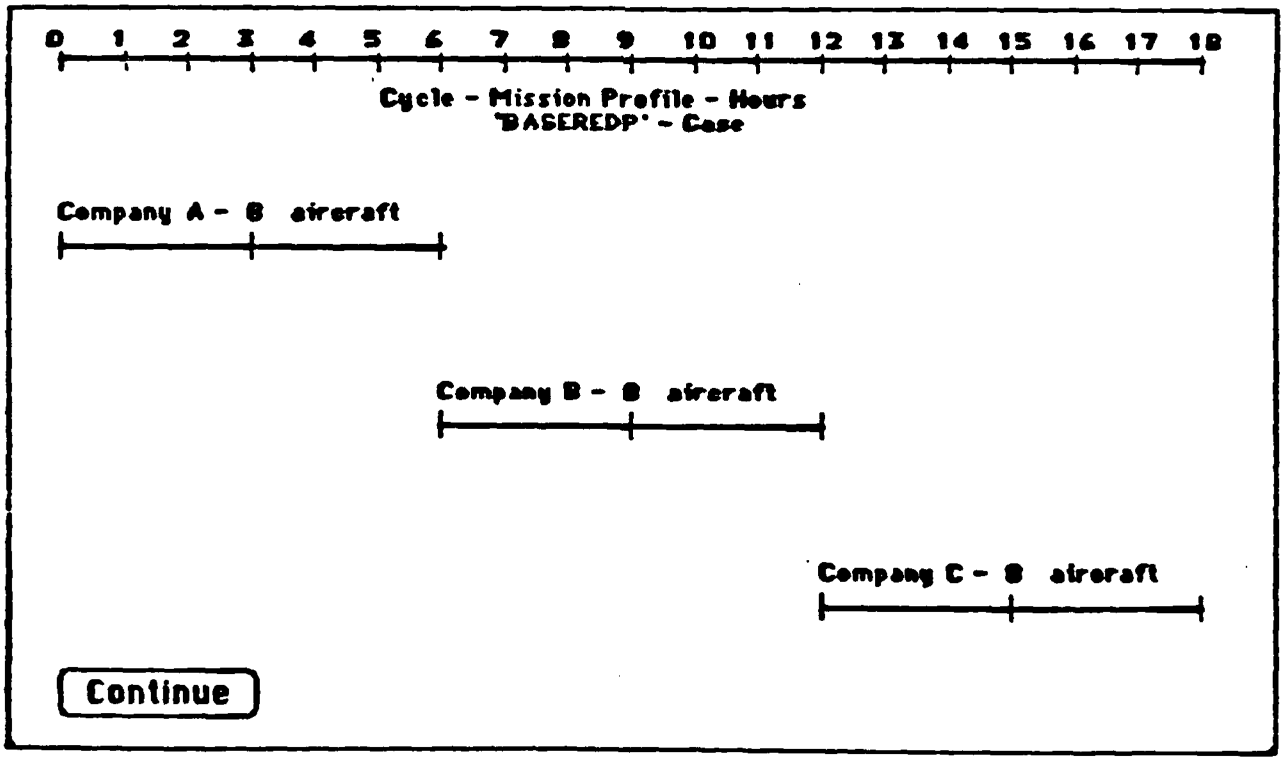
UNIT TYPE	AVG LAUNCH	AVG MSSN	MAX HRS PILOT	MSSN/ DAY/CO	PILOTS REQD
ATTACK	7.76	2.63	5.28	2.67	12.37
UTILITY	2.97	2.57	5.28	8.00	13.88
RECON (5 ACFT)	4.96	2.63	5.28	3.00	8.89
RECON (2 ACFT)	2.00	2.37	5.28	2.00	2.15
TOTAL RECON					11.05

REDUCED HEADQUARTERS STRENGTH - ATTACK

DivAirPPrt apl

Review or change availability and demand factors for case 'BASEREDP'

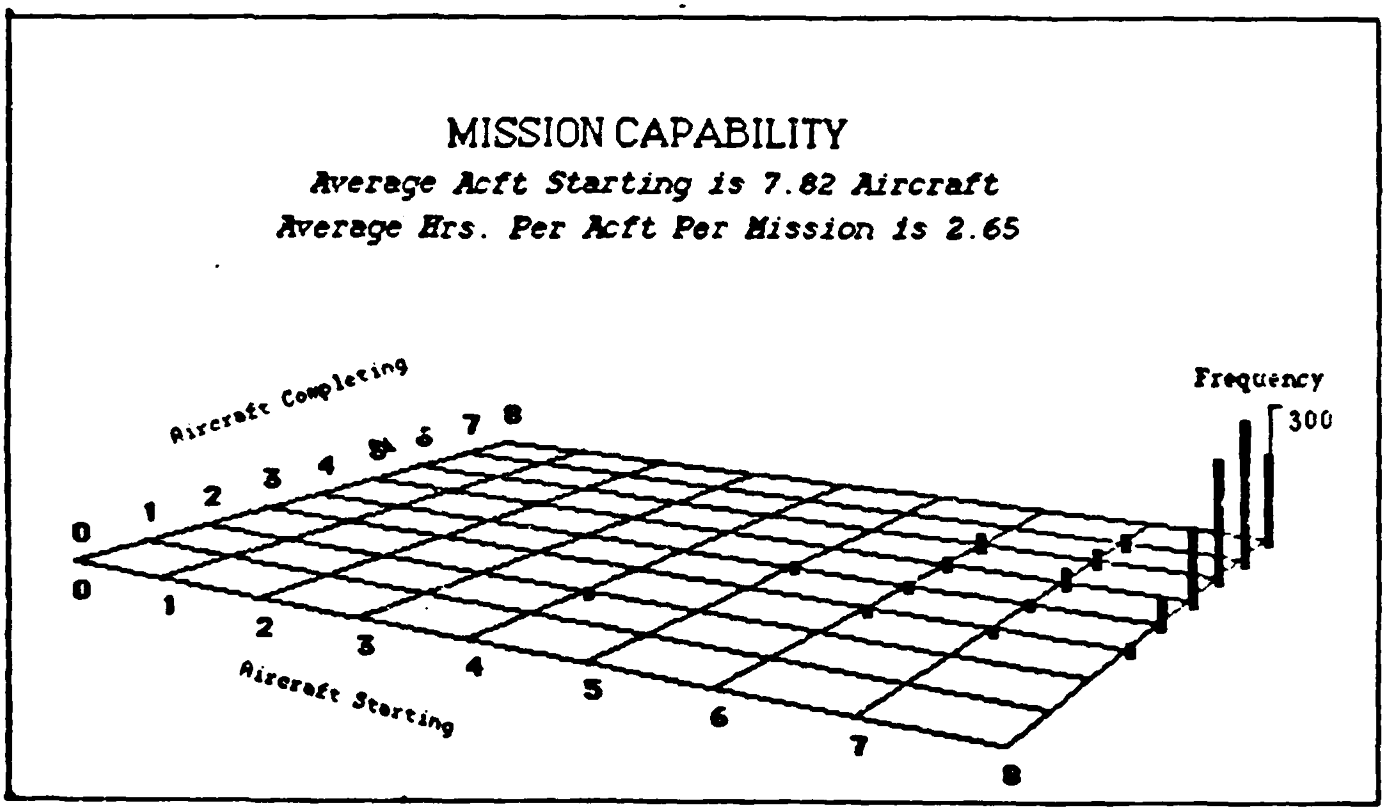
MTBEMA = 4.5 hrs	MTBMAF = 8.4 hrs
MTTR = 1 hrs	Cycle Length = 18 hrs
Msn Length = 3 hrs	Msn/Co/Cyc = 2
Msn Interval = 0 hrs	Aircraft/Mission = 8
Float Aircraft = 2	Comp per Cyc = 3
SubCycles = 1	



REDUCED HEADQUARTERS STRENGTH - ATTACK
(12 Replications of 4 Cycles)
(288 Missions)

Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.044
Troubleshoot	0.286
Tech Inspection	0.961



Aircraft Starting = The number of aircraft able to start the mission.

Aircraft Completing = The number of aircraft performing an entire 3 hr. mission

Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

REDUCED HEADQUARTERS STRENGTH - ATTACK

Division Aircraft Organization Capability Model - BASEREDP - 06-11-1987 - 06:28:56
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	2.007	0.000
Flt Line to HSC	0.476	0.000
At HSC	1.384	0.52[illegible]
HSC to AMC	0.[illegible]89	0.00[illegible]
At AMC	4.[illegible]09	0.76[illegible]
AMC to Flt Line	[illegible]41	0.000
HSC to Flt Line	[illegible]73	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.007
Float Available	.007
NMCS (PLL clerk)	.261

Aircraft Repair Frequency Count
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	179	67	550	796	61.3
PLL/Shp Stk	85	35	176	296	22.8
ASL	16	11	89	116	8.9
Float	4		2	6	0.5
Theater	14	10	47	71	5.5
Cont Sub			4	4	0.3
CONUS	2	3	4	9	0.7
Total	300	126	872	1298	
Percent	23.1	9.7	67.2	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4	2.3	3.3
PLL/Shp Stk	2.0	2.2	3.8
ASL	2.5	2.3	3.9
Float	126.0		75.2
Theater	38.9	30.2	40.4
Cont Sub			27.8
CONUS	264.6	176.9	199.7

REDUCED HEADQUARTERS STRENGTH - ATTACK

Mission Frequency Count - BASEREDP
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8	Tot	Pct	Cum Rtn	Cu Pc
8	-	-	-	-	-	-	-	-	51	51	17.7	51	17.
7	-	-	-	-	-	-	-	4	81	85	29.5	136	47.
6	-	-	-	-	-	-	7	6	66	79	27.4	215	74.
5	-	-	-	-	-	-	3	7	40	50	17.4	265	92.
4	-	-	-	-	-	1	2	1	14	18	6.2	283	98.
3	-	-	-	-	-	-	1	1	2	4	1.4	287	99.
2	-	-	-	-	1	-	-	-	-	1	0.3	288	100.
1	-	-	-	-	-	-	-	-	-	0	0.0	288	100.
0	-	-	-	-	-	-	-	-	-	0	0.0	288	100.
Total	0	0	0	0	1	1	13	19	254	288			
Percent	0.0	0.0	0.0	0.0	0.3	0.3	4.5	6.6	88.2	100			
Cum Rtn	288	288	288	288	288	287	286	273	254				
Cum Pct	100	100	100	100	100	99.7	99.3	94.8	88.2				

Composite Mission Times
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8
8	-	-	-	-	-	-	-	-	3.0
7	-	-	-	-	-	-	-	3.0	2.8
6	-	-	-	-	-	-	3.0	2.9	2.5
5	-	-	-	-	-	-	2.7	2.5	2.4
4	-	-	-	-	-	2.4	2.2	2.1	2.2
3	-	-	-	-	-	-	2.0	1.9	2.3
2	-	-	-	-	1.6	-	-	-	-
1	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-

Average is 2.65

REDUCED HEADQUARTERS STRENGTH - ATTACK

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	8.35
66(1)	1	2	0.75
67(2)	1	0	0.04
68(3)	1	0	1.59
68(4)	2	1	0.31
68G	1	0	2.77
68H	0	0	0.00
68K	1	0	3.35
35(5)	1	1	0.25

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	21.60
66(1)	4	4	1.03
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.05
68G	2	2	0.12
68H	2	1	0.44
68K	1	0	1.94
35(5)	8	7	0.00

REDUCED HEADQUARTERS STRENGTH - ATTACK

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.07

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.08

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	2.97

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	0
66(1)	1	2	.22
67(2)	1	0	0
68(3)	1	0	0
68(4)	2	1	0
68G	1	0	0
68H	0	0	0
68K	1	0	0
35(5)	1	1	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

REDUCED HEADQUARTERS STRENGTH - ATTACK

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	1.1

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	1.09

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	1.09

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	2.53
66(1)	1	2	.87
67(2)	1	0	.15
68(3)	1	0	.9
68(4)	2	1	1.22
68G	1	0	1.03
68H	0	0	0
68K	1	0	1.15
35(5)	1	1	.52

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	7.01
66(1)	4	4	1.93
67(2)	19	16	.12
68(3)	6	5	.69
68(4)	6	6	1
68G	2	2	1.01
68H	2	1	.61
68K	1	0	1.03
35(5)	8	7	.59

REDUCED HEADQUARTERS STRENGTH - ATTACK

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.09

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.07

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.04

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	0
66(1)	1	2	0
67(2)	1	0	0
68(3)	1	0	0
68(4)	2	1	0
68G	1	0	0
68H	0	0	0
68K	1	0	0
35(5)	1	1	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

REDUCED HEADQUARTERS STRENGTH - ATTACK

Division Aircraft Organization Capability Model - BASEREDP - 06-11-1987 - 06:34:26
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 11 11 11

MOS	Wkld/Rqd Str	
67(2)	9.1	10

HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	0	1	0.7	1
66(1)	1	2	1.0	1
67(2)	1	0	0.0	1
68(3)	1	0	0.3	1
68(4)	2	1	1.1	2
68G	1	0	0.3	1
68H	0	0	0.0	0
68K	1	0	0.3	1
35(5)	1	1	0.3	1

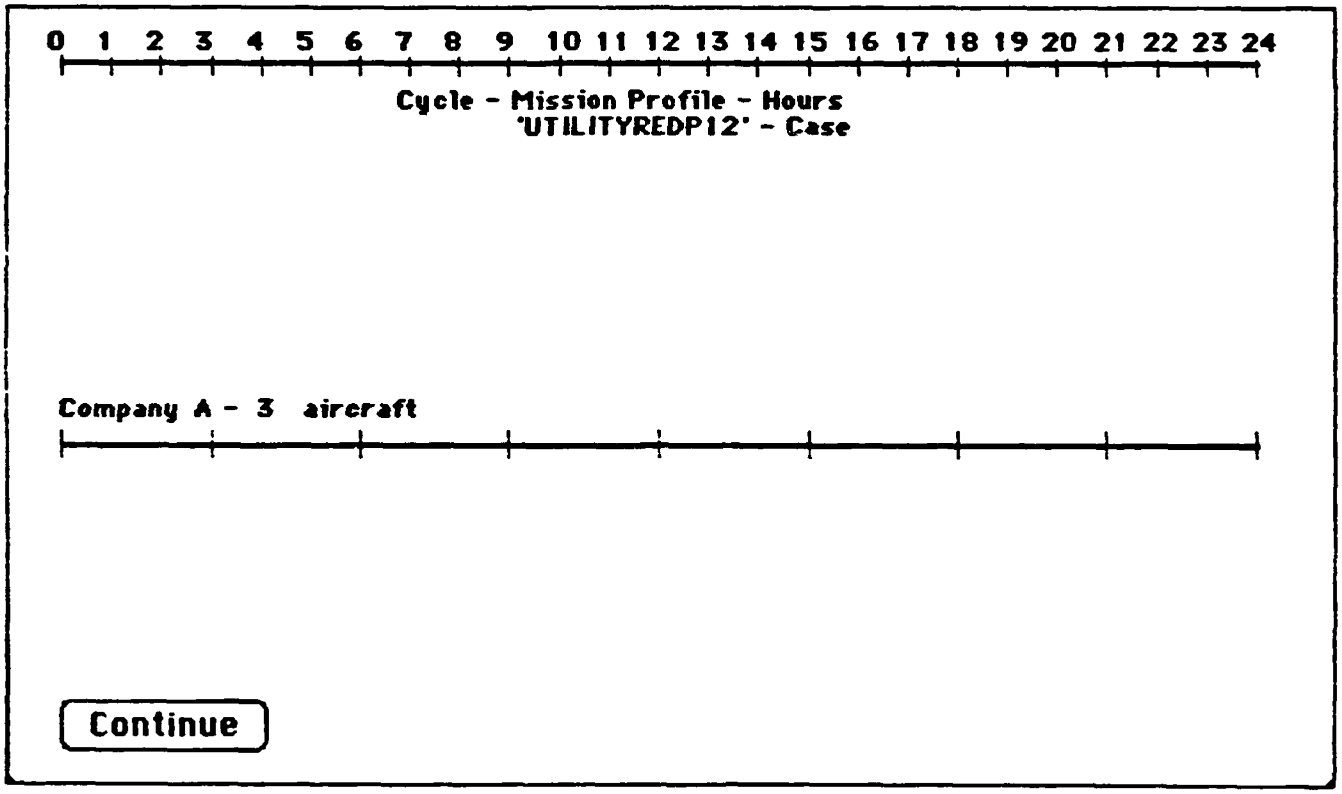
AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	2.1	3
66(1)	4	4	4.5	5
67(2)	19	18	1.7	2
68(3)	6	5	2.2	3
68(4)	6	6	3.5	4
68G	2	2	1.2	2
68H	2	1	0.5	1
68K	1	0	0.3	1
35(5)	8	7	2.6	3

DivAirPPrt apl

Review or change availability and demand factors for case 'UTILITYREDP12'

MTBEMA = 6.4 hrs	MTBMAF = 11.1 hrs
MTTR = 1 hrs	Cycle Length = 24 hrs
Msn Length = 3 hrs	Msn/Co/Cyc = 8
Msn Interval = 0 hrs	Aircraft/Mission = 3
Float Aircraft = 2	Comp per Cyc = 1
SubCycles = 1	



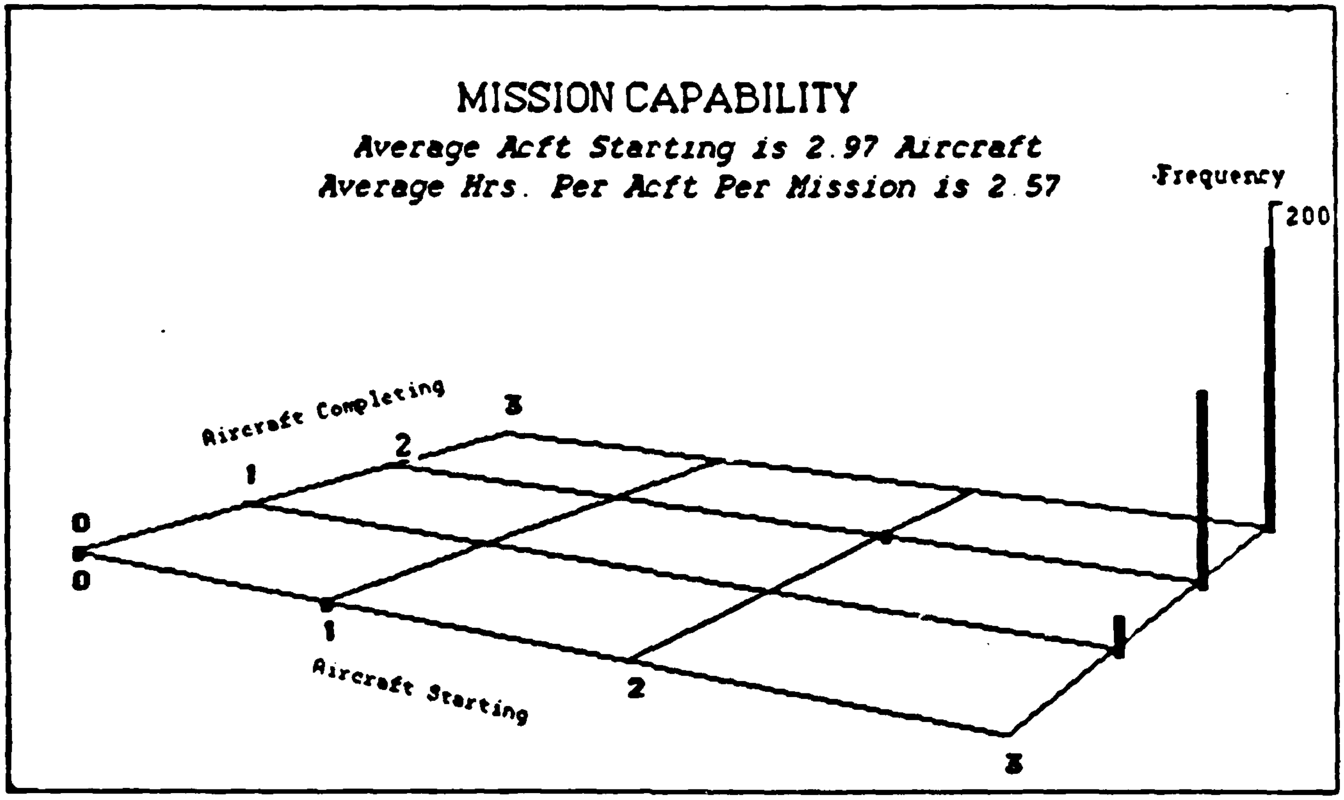
REDUCED HEADQUARTERS STRENGTH - UTILITY

(12 Replications of 3 Cycles)

(288 Missions)

Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.023
Troubleshoot	0.113
Tech Inspection	0.588



Aircraft Starting = The number of aircraft able to start the mission.

Aircraft Completing = The number of aircraft performing an entire 3 hr. mission

Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Division Aircraft Organization Capability Model - UTILITYREDP12 - 06-10-1987
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	2.616	0.000
Flt Line to HSC	0.000	0.000
At HSC	0.000	0.000
HSC to AMC	0.449	0.000
At AMC	10.733	0.725
AMC to Flt Line	0.387	0.000
HSC to Flt Line	0.000	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.019
Float Available	.019
NMCS (PLL clerk)	.282

Aircraft Repair Frequency Count
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	32		90	122	54.7
PLL/Shp Stk	12		43	55	24.7
ASL	3		17	20	9.0
Float	1		3	4	1.8
Theater	1		16	17	7.6
Cont Sub	1			1	0.4
CONUS	1		3	4	1.8
Total	51	0	172	223	
Percent	22.9	0.0	77.1	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4		3.3
PLL/Shp Stk	1.5		3.9
ASL	2.0		4.3
Float	27.2		26.9
Theater	48.8		43.2
Cont Sub	25.2		
CONUS	264.8		264.8

REDUCED HEADQUARTERS STRENGTH - UTILITY

Mission Frequency Count - UTILITYREDP12
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	Tot	Pct	Cum Rtn	Cum Pct
3	-	-	-	164	164	56.9	164	56.9
2	-	-	2	104	106	36.8	270	93.8
1	-	-	-	15	15	5.2	285	99.0
0	2	1	-	-	3	1.0	288	100.0
Total	2	1	2	283	288			
Percent	0.7	0.3	0.7	98.3	100			
Cum Rtn	288	286	285	283				
Cum Pct	100	99.3	99.0	98.3				

Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3
3	-	-	-	3.0
2	-	-	3.0	2.1
1	-	-	-	1.6
0	-	-	-	-

Average is 2.57

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	8	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0.00
66(1)	1	0	0.00
67(2)	0	0	0.00
68(3)	0	0	0.00
68(4)	0	0	0.00
68G	0	0	0.00
68H	0	0	0.00
68K	0	0	0.00
35(5)	0	0	0.00

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	3.53
66(1)	4	4	0.00
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.00
68G	2	2	0.00
68H	2	1	0.04
68K	1	0	0.78
35(5)	8	7	0.00

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	8	3.41

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AHC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	8	.47

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	1.46
66(1)	4	4	.36
67(2)	19	18	.02
68(3)	6	5	.12
68(4)	6	6	.21
68G	2	2	.2
68H	2	1	.1
68K	1	0	.6
35(5)	8	7	.11

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	8	.03

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	1	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

Division Aircraft Organization Capability Model - UTILITYREDP12 - 06-10-1987
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 8 0 0

MOS	Wkld/Rqd Str	
67(2)	7.0	8

HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	0	0	0.0	0
66(1)	1	0	0.0	0
67(2)	0	0	0.0	0
68(3)	0	0	0.0	0
68(4)	0	0	0.0	0
68G	0	0	0.0	0
68H	0	0	0.0	0
68K	0	0	0.0	0
35(5)	0	0	0.0	0

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	0.6	1
66(1)	4	4	1.2	2
67(2)	19	18	0.9	1
68(3)	6	5	0.5	1
68(4)	6	6	1.0	1
68G	2	2	0.3	1
68H	2	1	0.1	1
68K	1	0	0.2	1
35(5)	8	7	0.6	1

PERSONNEL REQUIREMENTS-PILOTS-REDUCED PERSONNEL

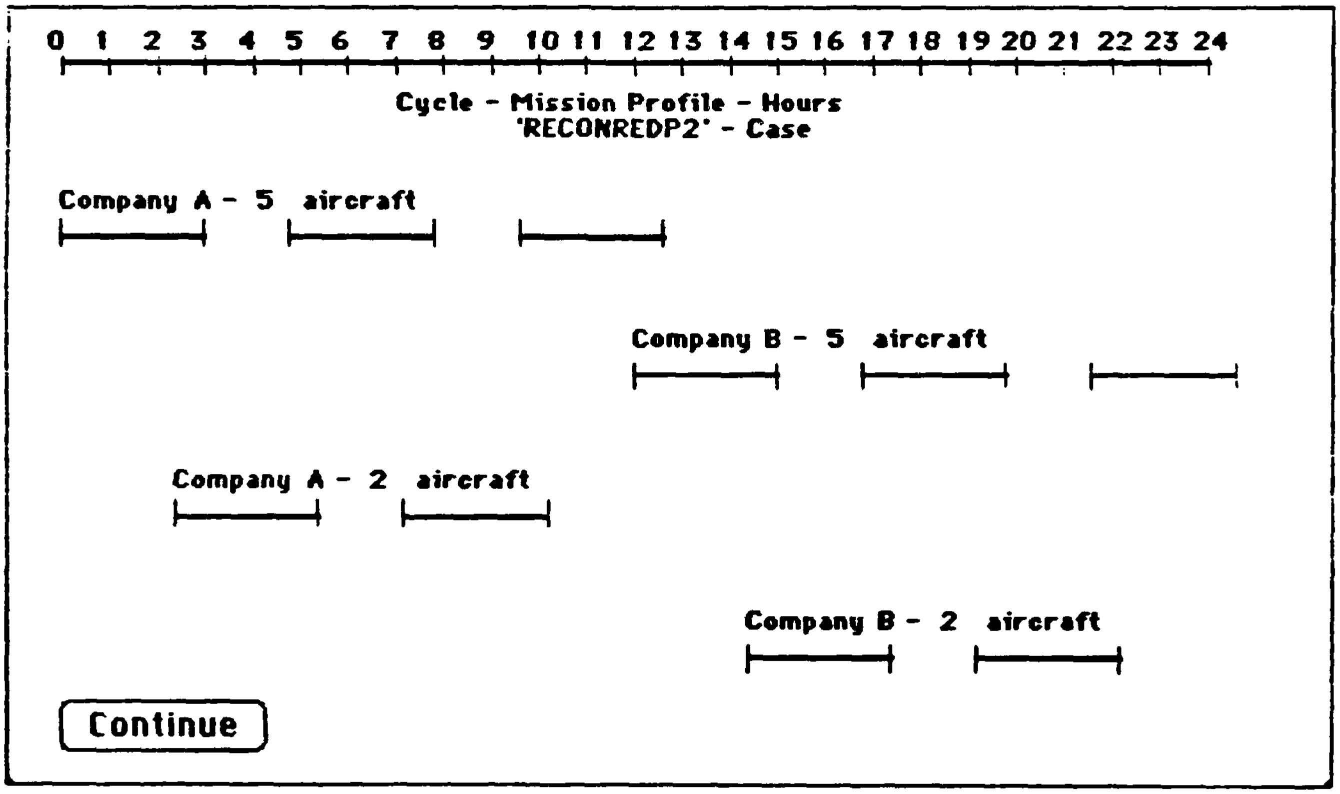
UNIT TYPE	AVG LAUNCH	AVG MSSN	MAX HRS PILOT	MSSN/ DAY/CO	PILOTS REQD
ATTACK	7.82	2.65	5.28	2.67	12.56
UTILITY	2.97	2.57	5.28	8.00	13.88
RECON (5 ACFT)	4.97	2.65	5.28	3.00	8.98
RECON (2 ACFT)	1.99	2.45	5.28	2.00	2.22
TOTAL RECON					11.20

REDUCED HEADQUARTERS STRENGTH - RECONNAISANCE

DivAirPPrt apl

Review or change availability and demand factors for case 'RECONREDP2'

MTBEMA = 4.5 hrs	MTBMAF = 8.4 hrs
MTTR = 1 hrs	Cycle Length = 24 hrs
Msn Length = 3 hrs	#Msn SubCyc 1 = 3
Msn Interval = 1.8 hrs	#Acft SubCyc 1 = 5
Float Aircraft = 2	Comp per Cyc = 2
SubCycles = 2	#Msn SubCyc 2 = 2
Sub2 Delay = 2.4 hrs	#Acft SubCyc 2 = 2



Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.064
Troubleshoot	0.238
Tech Inspection	1.248

Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5
5	-	-	-	-	-	3.0
4	-	-	-	-	-	2.6
3	-	-	-	3.0	2.3	2.3
2	-	-	-	2.0	-	2.0
1	-	-	-	-	-	1.7
0	-	-	-	-	-	-

Average is 2.65

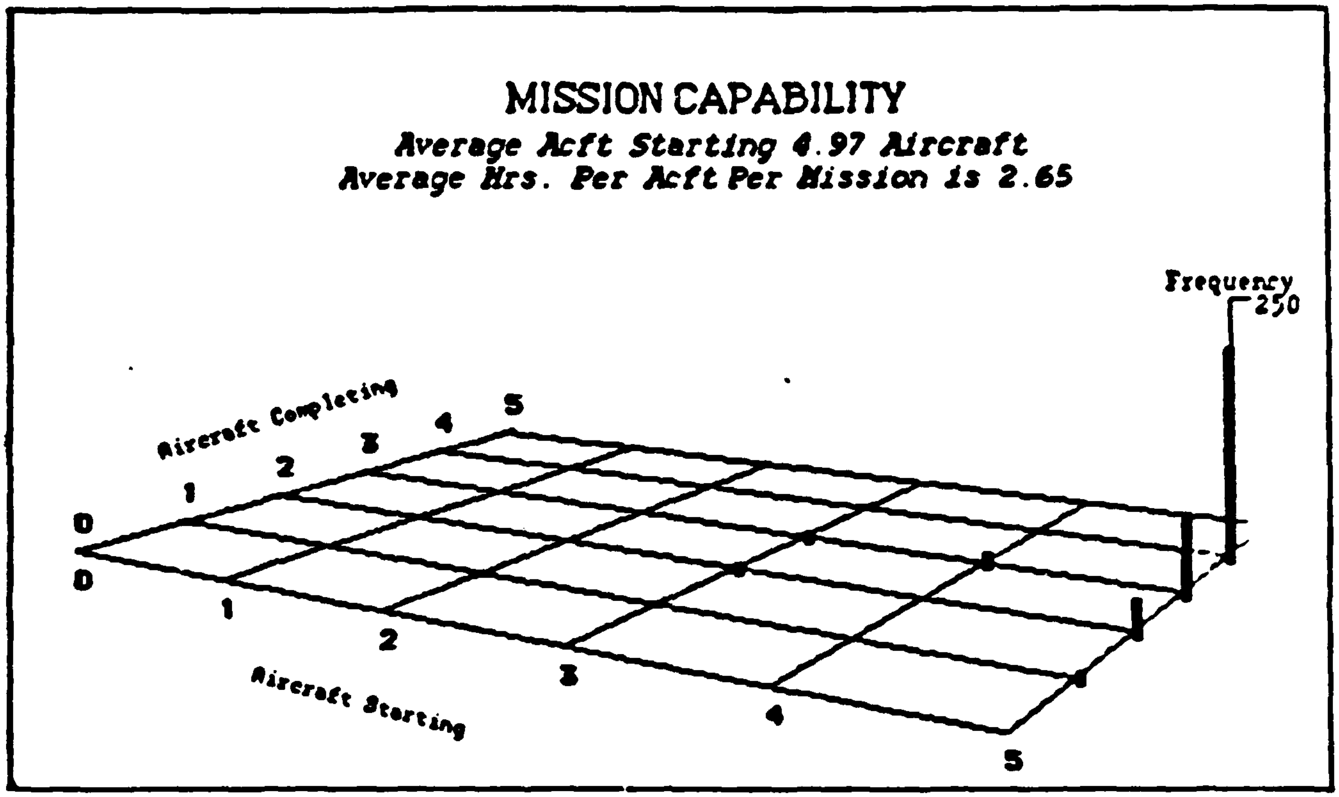
Composite Mission Times
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to start Mission

Aircraft Completing	0	1	2
2	-	-	3.0
1	-	-	2.0
0	-	-	-

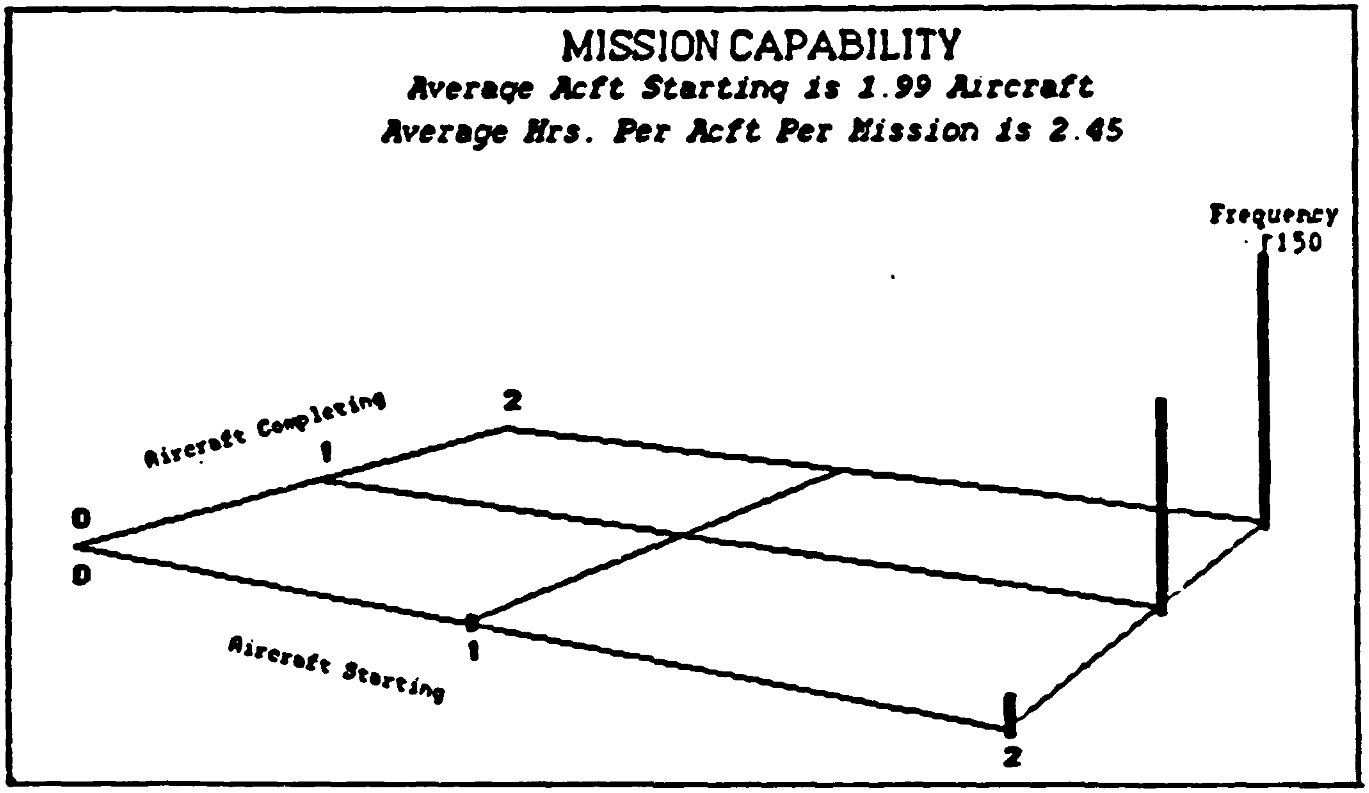
Average is 2.45

REDUCED HEADQUARTERS STRENGTH - RECONNAISSANCE
(12 Replications of 3 Cycles)
(204 Missions)



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

REDUCED HEADQUARTERS STRENGTH - RECONNAISSANCE
(12 Replications of 3 Cycles)
(104 Missions)



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Division Aircraft Organization Capability Model - RECONREDP2 - 06-12-1987 - 14:18:12
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	1.865	0.000
Flt Line to HSC	0.383	0.000
At HSC	2.183	0.908
HSC to AMC	0.326	0.000
At AMC	5.627	0.643
AMC to Flt Line	0.294	0.000
HSC to Flt Line	0.052	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.013
Float Available	.013
NMCS (PLL clerk)	.251

Aircraft Repair Frequency Count
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	76	14	288	378	57.4
PLL/Shp Stk	43	9	98	150	22.8
ASL	11	3	50	64	9.7
Float	1		4	5	0.8
Theater	12	5	31	48	7.3
Cont Sub	3		4	7	1.1
CONUS	1	2	4	7	1.1
Total	147	33	479	659	
Percent	22.3	5.0	72.7	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 3 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4	2.4	3.5
PLL/Shp Stk	2.0	2.0	4.1
ASL	2.4	1.7	4.2
Float	72.0		111.1
Theater	41.2	49.2	40.4
Cont Sub	10.0		28.9
CONUS	265.2	264.0	265.5

Mission Frequency Count - RECONREDP2
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	Tot	Pct	Cum Rtn	Cum Pct
5	-	-	-	-	-	73	73	35.8	73	35.8
4	-	-	-	-	-	85	85	41.7	158	77.4
3	-	-	-	1	3	28	32	15.7	190	93.1
2	-	-	-	1	-	11	12	5.9	202	99.0
1	-	-	-	-	-	2	2	1.0	204	100.0
0	-	-	-	-	-	-	0	0.0	204	100.0
Total	0	0	0	2	3	199	204			
Percent	0.0	0.0	0.0	1.0	1.5	97.5	100			
Cum Rtn	204	204	204	204	202	199				
Cum Pct	100	100	100	100	99.0	97.5				

Mission Frequency Count - RECONREDP2
For 12 Replications of cycles 1 to 3 of 3 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	Tot	Pct	Cum Rtn	Cum Pct
2	-	-	82	82	56.9	82	56.9
1	-	-	54	54	37.5	136	94.4
0	-	1	7	8	5.6	144	100.0
Total	0	1	143	144			
Percent	0.0	0.7	99.3	100			
Cum Rtn	144	144	143				
Cum Pct	100	100	99.3				

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	10	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	10	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	0	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	2.54
66(1)	0	1	11.07
67(2)	1	0	0.53
68(3)	1	0	0.16
68(4)	1	1	0.40
68G	1	0	1.39
68H	0	0	0.00
68K	1	0	1.65
35(5)	1	0	0.41

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	11.23
66(1)	4	4	0.12
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.00
68G	2	2	0.11
68H	2	1	0.28
68K	1	0	1.11
35(5)	8	7	0.01

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	2.91

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	2.81

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	0
66(1)	0	1	.67
67(2)	1	0	0
68(3)	1	0	0
68(4)	1	1	0
68G	1	0	0
68H	0	0	0
68K	1	0	0
35(5)	1	0	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.94

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.83

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	.87
66(1)	0	1	1.54
67(2)	1	0	.08
68(3)	1	0	.38
68(4)	1	1	.67
68G	1	0	.58
68H	0	0	0
68K	1	0	.78
35(5)	1	0	.13

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	3.26
66(1)	4	4	1
67(2)	19	18	.07
68(3)	6	5	.39
68(4)	6	6	.53
68G	2	2	.51
68H	2	1	.3
68K	1	0	.53
35(5)	8	7	.29

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.08

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	10	.07

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	0	0

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	1	0
66(1)	0	1	0
67(2)	1	0	0
68(3)	1	0	0
68(4)	1	1	0
68G	1	0	0
68H	0	0	0
68K	1	0	0
35(5)	1	0	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

REDUCED HEADQUARTERS STRENGTH - RECONNAISANCE

Division Aircraft Organization Capability Model - RECONREDP2 - 06-12-1987 - 14:24:07
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 10 10 0

MOS	Wkld/Rqd Str	
67(2)	7.7	8

HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	0	1	0.3	1
66(1)	0	1	0.6	1
67(2)	1	0	0.0	0
68(3)	1	0	0.1	1
68(4)	1	1	0.4	1
68G	1	0	0.2	1
68H	0	0	0.0	0
68K	1	0	0.2	1
35(5)	1	0	0.0	0

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	1.0	1
66(1)	4	4	2.3	3
67(2)	19	18	1.2	2
68(3)	6	5	1.3	2
68(4)	6	6	1.9	2
68G	2	2	0.6	1
68H	2	1	0.3	1
68K	1	0	0.2	1
35(5)	8	7	1.3	2

CLASS II SUPPLY PERSONNEL REQUIREMENTS-REDUCTION OF HEADQUARTERS PERSONNEL

UNIT TYPE	STOCKAGE LEVEL	LINES/ LEVEL	NO OF REQ	NO. DAYS	TOTAL REQ	SUM OF REQ	SUM OF LINES	REQ/LINE /DAY	WORK LOAD	PARTS REQ FLT LINE	PARTS REQ MSC	TOTAL PARTS	NO PARTS	REQ BY MANCAP	REQ/ DAY	MANPOWER REQ
AT PLL																
ATTACK	1.00	44.00	1.00	100.00	44.00											
	2.00	23.00	18.00	100.00	414.00											
	3.00	11.00	30.00	100.00	330.00											
	4.00	5.00	42.00	100.00	210.00											
	5.00	1.00	53.00	100.00	53.00											
	9.00	3.00	100.00	100.00	300.00	1351.00	87.00	0.09	37.53	121.00	59.00	1298.00	796.00	100.00	5.00	0.13
UTILITY	1.00	56.00	1.00	100.00	56.00											
	2.00	5.00	18.00	100.00	90.00											
	3.00	1.00	30.00	100.00	30.00											
	4.00	2.00	42.00	100.00	84.00	260.00	64.00	0.02	9.82	19.00	0.00	223.00	122.00	19.00	0.53	0.05
RECON	1.00	60.00	1.00	100.00	60.00											
	2.00	14.00	18.00	100.00	252.00											
	3.00	6.00	30.00	100.00	180.00											
	4.00	1.00	42.00	100.00	42.00											
	6.00	1.00	65.00	100.00	65.00											
	7.00	2.00	77.00	100.00	154.00	753.00	84.00	0.05	21.66	71.00	19.00	659.00	378.00	90.00	2.50	0.12
AT ASL																
	1.00	53.00	3.00	360.00	159.00											
	2.00	29.00	13.00	360.00	377.00											
	3.00	6.00	24.00	360.00	144.00											
	4.00	6.00	25.00	360.00	150.00											
ATTACK	6.00	4.00	37.00	360.00	148.00	978.00	98.00	0.03	12.06					502.00	13.94	1.16
UTILITY														101.00	2.01	0.23
RECON														281.00	7.81	0.65

TOTAL MANPOWER REQUIRED
AT DISCOM = 2.04

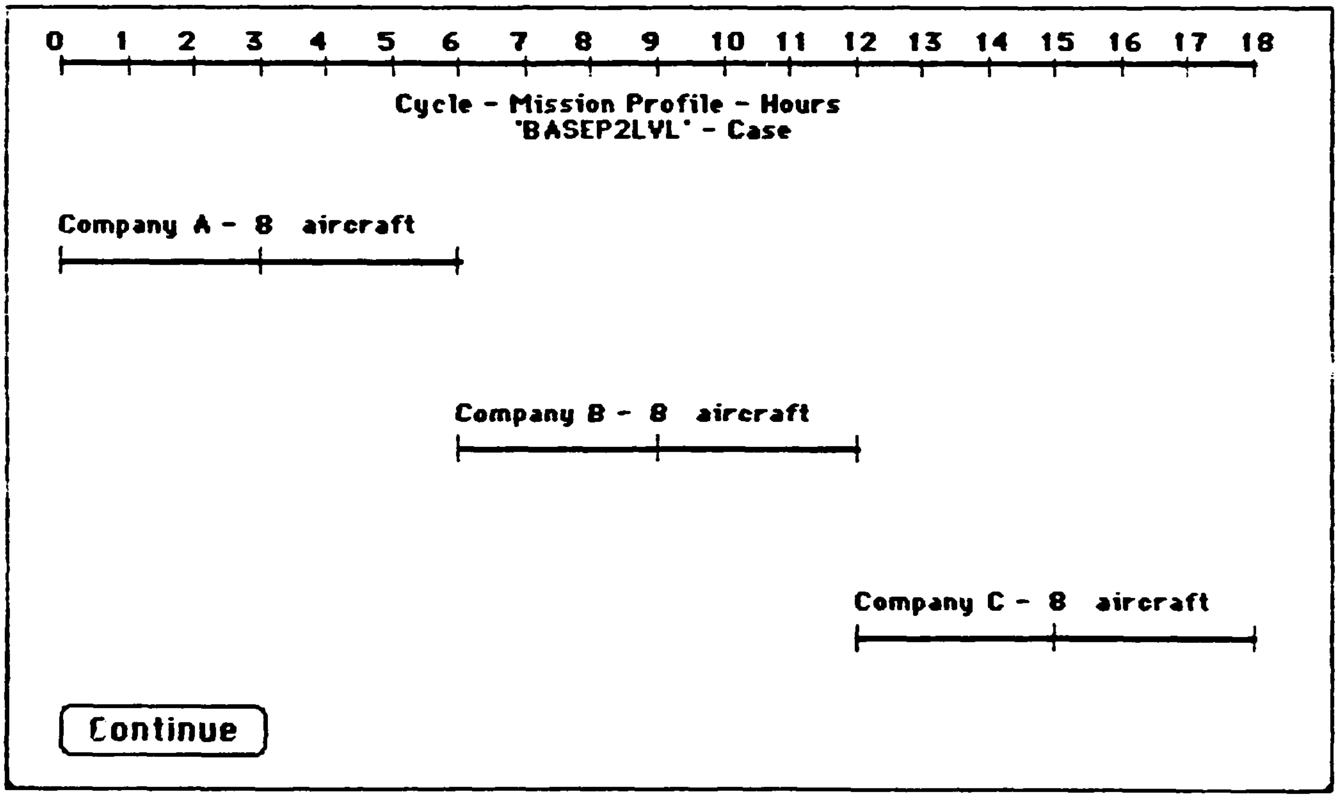
PERSONNEL REQUIREMENTS-PILOTS-ELIMINATION OF AMC

UNIT TYPE	AVG LAUNCH	AVG MSSN	MAX HRS PILOT	MSSN/ DAY/CO	PILOTS REQD
ATTACK	7.67	2.62	5.28	2.67	12.18

DivAirPPrt apl

Review or change availability and demand factors for case 'BASEP2LVL'

MTBEMA = 4.5 hrs	MTBMAF = 8.4 hrs
MTTR = 1 hrs	Cycle Length = 18 hrs
Msn Length = 3 hrs	Msn/Co/Cyc = 2
Msn Interval = 0 hrs	Aircraft/Mission = 8
Float Aircraft = 2	Comp per Cyc = 3
SubCycles = 1	

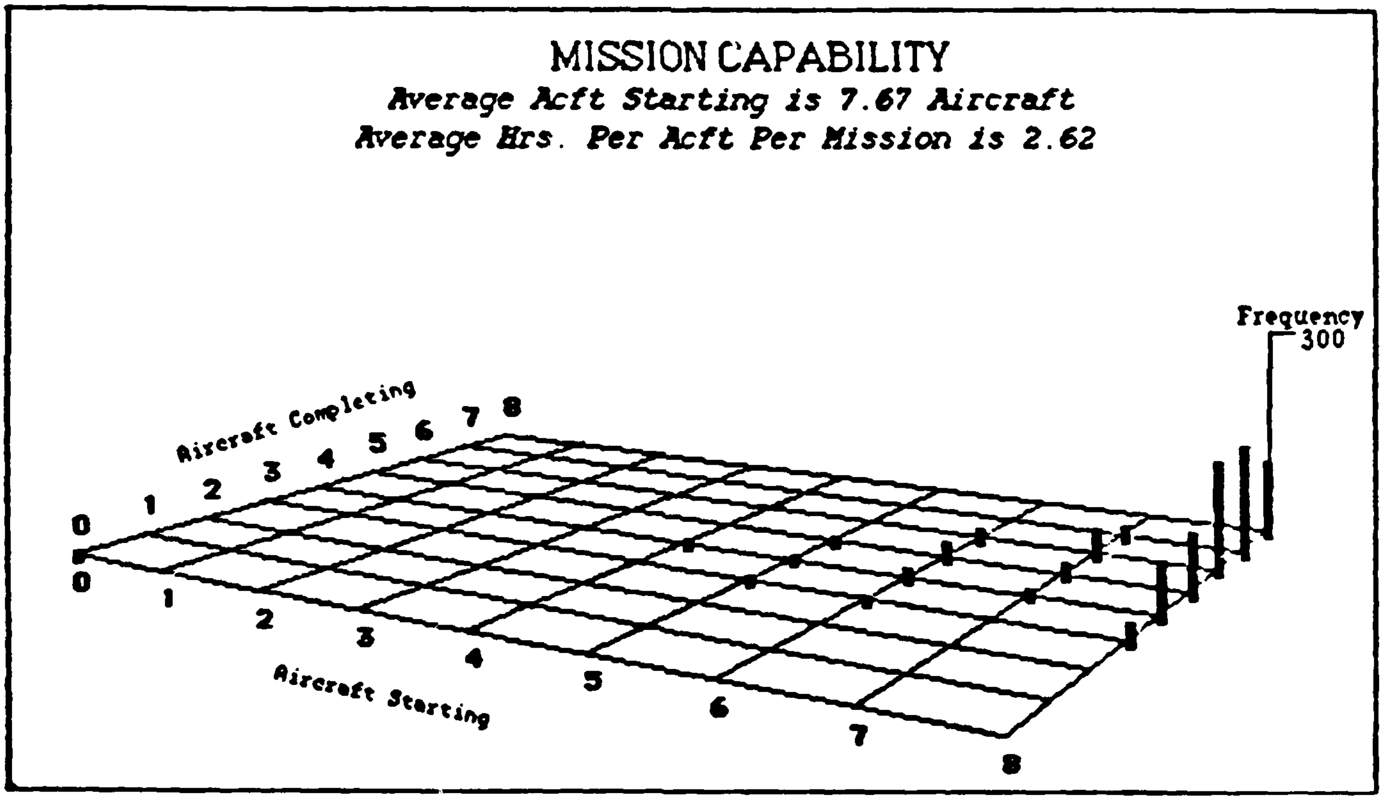


(12 Replications of 4 Cycles)

(288 Missions)

Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.147
Troubleshoot	0.244
Tech Inspection	0.170



Aircraft Starting	=	The number of aircraft able to start the mission.
Aircraft Completing	=	The number of aircraft performing an entire 3 hr. mission.
Frequency	=	The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

ELIMINATION OF AMC - ATTACK

Division Aircraft Organization Capability Model - BASEP2LVL - 06-11-1987 - 06:38:29
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	3.059	0.000
Flt Line to HSC	0.469	0.000
At HSC	7.040	0.560
HSC to AMC	0.000	0.000
At AMC	0.000	0.000
AMC to Flt Line	0.008	0.000
HSC to Flt Line	0.420	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.008
Float Available	.008
NMCS (PLL clerk)	.263

Aircraft Repair Frequency Count
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	181	606		787	59.3
PLL/Shp Stk	80	235		315	23.7
ASL	24	89		113	8.5
Float	4	4		8	0.6
Theater	27	64		91	6.9
Cont Sub				0	0.0
CONUS	4	9		13	1.0
Total	320	1007	0	1327	
Percent	24.1	75.9	0.0	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.6	2.8	
PLL/Shp Stk	2.0	2.9	
ASL	2.5	3.2	
Float	180.0	92.7	
Theater	38.7	40.4	
Cont Sub			
CONUS	264.6	265.1	

ELIMINATION OF AMC - ATTACK

Mission Frequency Count - BASEP2LVL
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8	Tot	Pct	Cum Rtn	Cum Pct
8	-	-	-	-	-	-	-	-	42	42	14.6	42	14.6
7	-	-	-	-	-	-	-	5	62	67	23.3	109	37.8
6	-	-	-	-	-	-	5	14	60	79	27.4	188	65.3
5	-	-	-	-	-	2	8	6	32	48	16.7	236	81.9
4	-	-	-	-	2	2	4	3	29	40	13.9	276	95.8
3	-	-	-	-	-	1	1	-	9	11	3.8	287	99.7
2	-	-	-	-	-	-	-	-	-	0	0.0	287	99.7
1	-	-	-	-	-	-	-	-	-	0	0.0	287	99.7
0	1	-	-	-	-	-	-	-	-	1	0.3	288	100.0
Total	1	0	0	0	2	5	18	28	234	288			
Percent	0.3	0.0	0.0	0.0	0.7	1.7	6.2	9.7	81.2	100			
Cum Rtn	288	287	287	287	287	285	280	262	234				
Cum Pct	100	99.7	99.7	99.7	99.7	99.0	97.2	91.0	81.2				

Composite Mission Times
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8
8	-	-	-	-	-	-	-	-	3.0
7	-	-	-	-	-	-	-	3.0	2.8
6	-	-	-	-	-	-	3.0	2.8	2.6
5	-	-	-	-	-	3.0	2.6	2.3	2.4
4	-	-	-	-	3.0	2.4	2.4	2.3	2.2
3	-	-	-	-	-	2.3	2.1	-	2.0
2	-	-	-	-	-	-	-	-	-
1	-	-	-	-	-	-	-	-	-
0	-	-	-	-	-	-	-	-	-

Average is 2.62

ELIMINATION OF AMC - ATTACK

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	2	1	3.60
66(1)	3	3	2.00
67(2)	1	1	1.12
68(3)	2	1	0.94
68(4)	3	2	0.98
68G	1	1	1.19
68H	1	0	3.17
68K	1	0	4.27
35(5)	2	1	1.21

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0.00
66(1)	0	0	0.00
67(2)	0	0	0.00
68(3)	0	0	0.00
68(4)	0	0	0.00
68G	0	0	0.00
68H	0	0	0.00
68K	0	0	0.00
35(5)	0	0	0.00

ELIMINATION OF AMC - ATTACK

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.08

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.03

C-AHC Missio. Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	3.04

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	2	1	0
66(1)	3	3	.11
67(2)	1	1	0
68(3)	2	1	0
68(4)	3	2	0
68G	1	1	0
68H	1	0	0
68K	1	0	0
35(5)	2	1	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	0	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.69

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.68

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.68

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	2	1	3.36
66(1)	3	3	2.98
67(2)	1	1	2.71
68(3)	2	1	2.44
68(4)	3	2	3.27
68G	1	1	2.74
68H	1	0	1.53
68K	1	0	2.24
35(5)	2	1	3.16

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	0	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

ELIMINATION OF AHC - ATTACK

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.07

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.07

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.09

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	2	1	0
66(1)	3	3	0
67(2)	1	1	0
68(3)	2	1	0
68(4)	3	2	0
68G	1	1	0
68H	1	0	0
68K	1	0	0
35(5)	2	1	0

AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	0	0	0
66(1)	0	0	0
67(2)	0	0	0
68(3)	0	0	0
68(4)	0	0	0
68G	0	0	0
68H	0	0	0
68K	0	0	0
35(5)	0	0	0

Division Aircraft Organization Capability Model - BASEP2LVL
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 11 11 11

MOS	Wkld/Rqd Str	
67(2)	8.8	9

HSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	2	1	3.0	3
66(1)	3	3	5.5	6
67(2)	1	1	1.6	2
68(3)	2	1	2.1	3
68(4)	3	2	4.8	5
68G	1	1	1.6	2
68H	1	0	0.4	1
68K	1	0	0.7	1
35(5)	2	1	2.8	3

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	0	0	0.0	0
66(1)	0	0	0.0	0
67(2)	0	0	0.0	0
68(3)	0	0	0.0	0
68(4)	0	0	0.0	0
68G	0	0	0.0	0
68H	0	0	0.0	0
68K	0	0	0.0	0
35(5)	0	0	0.0	0

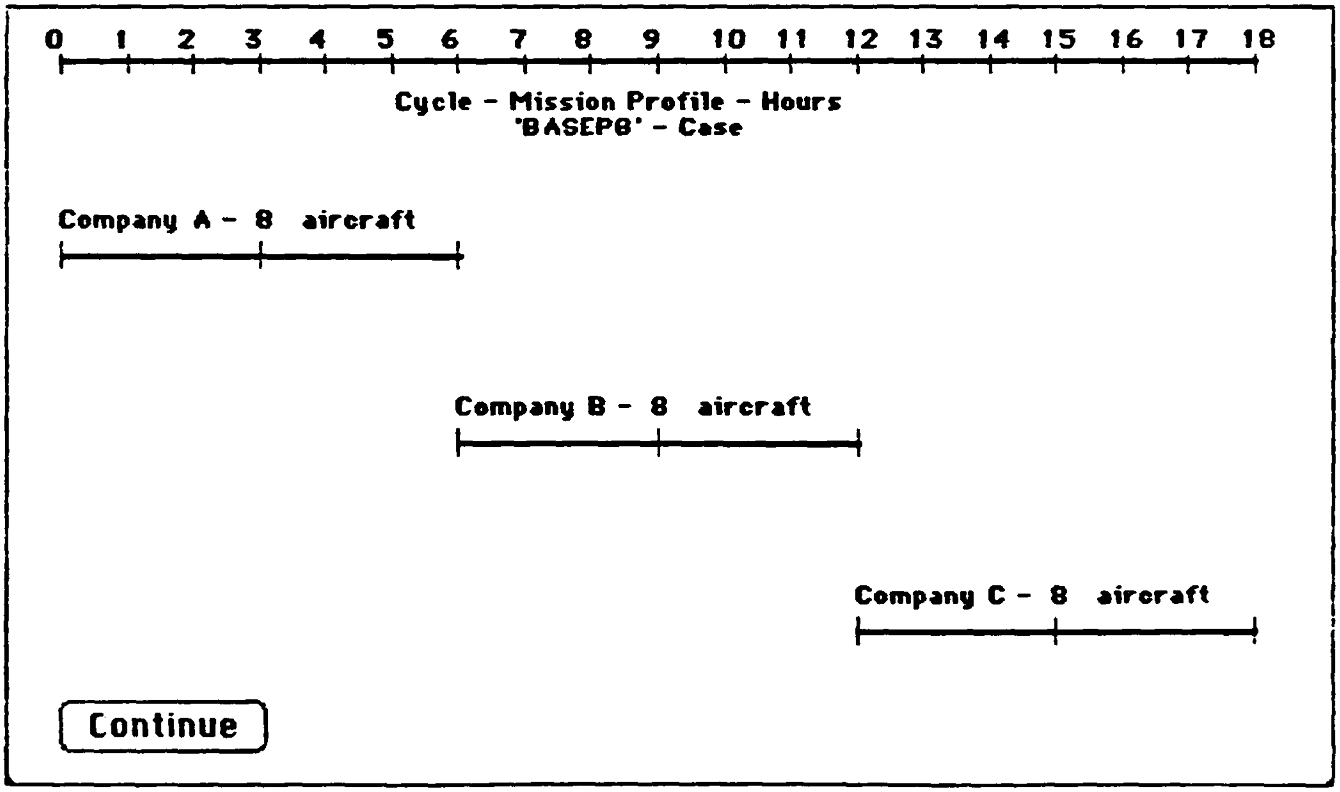
PERSONNEL REQUIREMENTS-PILOTS-ELIMINATION OF AMC

UNIT TYPE	AVG LAUNCH	AVG MSSN	MAX HRS PILOT	MSSN/ DAY/CO	PILOTS REQD
ATTACK	7.67	2.62	5.28	2.67	12.18

DivAirPPrt apl

Review or change availability and demand factors for case 'BASEP8'

MTBEMA = 4.5 hrs	MTBMAF = 8.4 hrs
MTTR = 1 hrs	Cycle Length = 18 hrs
Msn Length = 3 hrs	Msn/Co/Cyc = 2
Msn Interval = 0 hrs	Aircraft/Mission = 8
Float Aircraft = 2	Comp per Cyc = 3
SubCycles = 1	

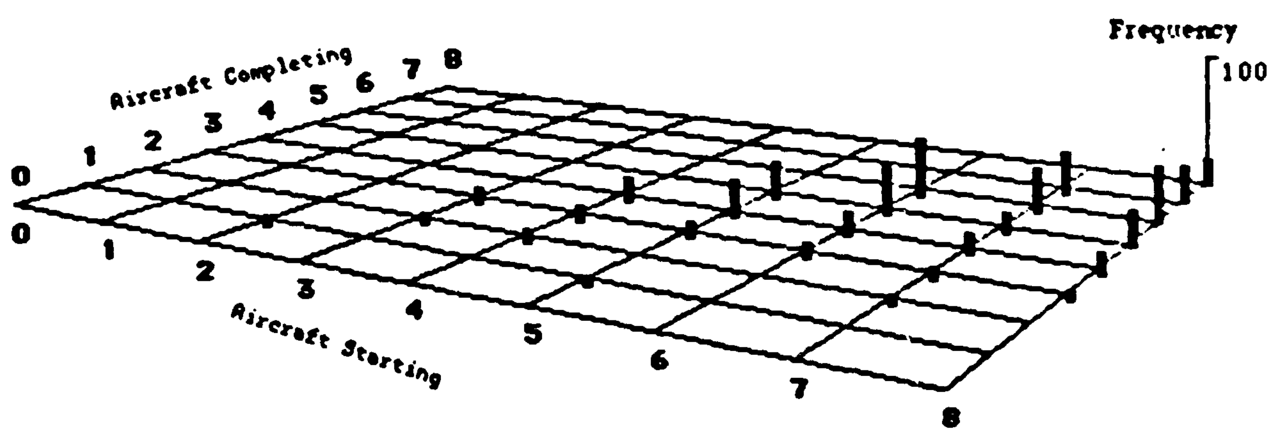


REDUCTION OF AIRCRAFT - ATTACK
(12 Replications of 4 Cycles)
(288 Missions)

Aircraft Hours per Day Delayed in Various Operations

Operational Category	Delay Time
Downed Aircraft	0.000
Daily	0.000
Launch	0.000
Recover fr Msn	0.000
Recover fr H/L Mnt	0.000
Floats & Xport	0.000
Perform EMA's	0.053
Troubleshoot	0.176
Tech Inspection	0.983

MISSION CAPABILITY
Average Acft Starting is 6.54 Aircraft
Average Hrs.Per Acft Per Mission is 2.70



Aircraft Starting = The number of aircraft able to start the mission.
Aircraft Completing = The number of aircraft performing an entire 3 hr. mission
Frequency = The number of missions with the configuration indicated by the intersection of th eaircraft starting and aircraft completing axes.

Division Aircraft Organization Capability Model - BASEP8 - 06-10-1987 - 14:41:22
Aircraft Hours per Day in Various Repair Catagories

Category	Process Time	Await Psnl Time
On Flight Line	3.593	0.000
Flt Line to HSC	0.536	0.000
At HSC	2.672	0.588
HSC to AMC	0.317	0.000
At AMC	4.719	0.624
AMC to FltLine	0.283	0.000
HSC to Flt Line	0.182	0.000

Overhead Aircraft Utilization (Per Aircraft Per Day)

HSC Requested	0
HSC Available	0
Float Requested	.0100001
Float Available	9.00001E-03
NMCS (PLL clerk)	.31

Aircraft Repair Frequency Count
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC	Total	Percent
No Parts	153	187	305	645	60.1
PLL/Shp Stk	56	75	114	245	22.8
ASL	26	25	52	103	9.6
Float	8	1	1	10	0.9
Theater	18	16	24	58	5.4
Cont Sub		1		1	0.1
CONUS	3	2	6	11	1.0
Total	264	307	502	1073	
Percent	24.6	28.6	46.8	100	

Average Aircraft Repair Times (hours)
For 12 Replications of 4 Cycles

Aircraft Location

Parts From	Flt Line	HSC	AMC
No Parts	0.4	3.0	3.5
PLL/Shp Stk	2.0	3.8	4.0
ASL	2.5	4.1	4.1
Float	108.4	75.2	291.2
Theater	46.4	46.3	33.7
Cont Sub		26.8	
CONUS	264.4	265.2	265.5

Mission Frequency Count - BASEP8
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8	Tot	Pct	Cum Rtn	Cum Pct
8	-	-	-	-	-	-	-	-	15	15	5.2	15	5.2
7	-	-	-	-	-	-	-	21	22	43	14.9	58	20.1
6	-	-	-	-	-	-	30	22	31	83	28.8	141	49.0
5	-	-	-	-	-	18	24	8	18	68	23.6	209	72.6
4	-	-	-	-	10	16	9	7	8	50	17.4	259	89.9
3	-	-	-	4	5	4	4	3	1	21	7.3	280	97.2
2	-	-	-	2	3	-	-	1	-	6	2.1	286	99.3
1	-	-	1	-	-	1	-	-	-	2	0.7	288	100.0
0	-	-	-	-	-	-	-	-	-	0	0.0	288	100.0
Total	0	0	1	6	18	39	67	62	95	288			
Percent	0.0	0.0	0.3	2.1	6.2	13.5	23.3	21.5	33.0	100			
Cum Rtn	288	288	288	287	281	263	224	157	95				
Cum Pct	100	100	100	99.7	97.6	91.3	77.8	54.5	33.0				

Composite Mission Times
For 12 Replications of cycles 1 to 4 of 4 cycles

Aircraft Available to Start Mission

Aircraft Completing	0	1	2	3	4	5	6	7	8
8	-	-	-	-	-	-	-	-	3.0
7	-	-	-	-	-	-	-	3.0	2.8
6	-	-	-	-	-	-	3.0	2.7	2.6
5	-	-	-	-	-	3.0	2.6	2.5	2.4
4	-	-	-	-	3.0	2.5	2.5	2.4	2.4
3	-	-	-	3.0	2.3	2.3	2.3	2.4	2.0
2	-	-	-	2.4	1.9	-	-	1.8	-
1	-	-	1.5	-	-	1.6	-	-	-
0	-	-	-	-	-	-	-	-	-

Average is 2.70

REDUCTION OF AIRCRAFT - ATTACK

A-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

B-AHC Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

C-Equipment Awaiting Personnel - Man Hours per Company Day

MOS	Str	MH/D
67(2)	11	0.00

HSC Equipment Awaiting Personnel - Man Hours per HSC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	11.11
66(1)	4	3	0.05
67(2)	8	7	0.00
68(3)	2	2	0.04
68(4)	5	4	0.01
68G	2	1	0.29
68H	0	0	0.00
68K	1	0	2.60
35(5)	5	4	0.00

AMC Equipment Awaiting Personnel - Man Hours per AMC Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	12.28
66(1)	4	4	0.16
67(2)	19	18	0.00
68(3)	6	5	0.00
68(4)	6	6	0.00
68G	2	2	0.05
68H	2	1	0.25
68K	1	0	2.23
35(5)	8	7	0.00

A-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	2.51

B-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	2.4

C-AHC Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	2.43

HSC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	3	.1
67(2)	8	7	0
68(3)	2	2	0
68(4)	5	4	0
68G	2	1	0
68H	0	0	0
68K	1	0	0
35(5)	5	4	0

AMC Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	.04
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

REDUCTION OF AIRCRAFT - ATTACK

A-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.82

B-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.82

C-AHC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.81

HSC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	3.49
66(1)	4	3	.76
67(2)	8	7	.09
68(3)	2	2	.6
68(4)	5	4	.69
68G	2	1	.64
68H	0	0	0
68K	1	0	1.16
35(5)	5	4	.34

AMC Non-Mission Capable Maintenance - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	3.46
66(1)	4	4	1.2
67[illegible]	19	18	.07
6[illegible]	6	5	.46
[illegible]	6	6	.52
[illegible]	2	2	.68
[illegible]H	2	1	.44
[illegible]8K	1	0	.94
35(5)	8	7	.35

REDUCTION OF AIRCRAFT - ATTACK

A-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.06

B-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.09

C-AHC Non-Mission Capable Supply - Man Hours per Day

MOS	Str	MH/D
67(2)	11	.05

HSC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	3	0
67(2)	8	7	0
68(3)	2	2	0
68(4)	5	4	0
68G	2	1	0
68H	0	0	0
68K	1	0	0
35(5)	5	4	0

AMC Non-Mission Capable Supply - Man Hours per Day

MOS	Shift 1	Shift 2	MH/D
66J	1	0	0
66(1)	4	4	0
67(2)	19	18	0
68(3)	6	5	0
68(4)	6	6	0
68G	2	2	0
68H	2	1	0
68K	1	0	0
35(5)	8	7	0

Division Aircraft Organization Capability Model - BASEPB - 06-10-1987
Company Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

Current company strengths are: 11 11 11

MOS	Wkld/Rqd Str	
67(2)	7.3	8

MSC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	1.4	2
66(1)	4	3	2.4	3
67(2)	8	7	0.5	1
68(3)	2	2	1.0	1
68(4)	5	4	2.5	3
68G	2	1	0.8	1
68H	0	0	0.0	0
68K	1	0	0.5	1
35(5)	5	4	1.2	2

AMC Projection of Required Personnel
Based on 3.4 direct and 2.5 indirect hours

MOS	Shift 1	Shift 2	Wkld/Rqd Str	
66J	1	0	1.4	2
66(1)	4	4	3.9	4
67(2)	19	18	1.5	2
68(3)	6	5	2.0	2
68(4)	6	6	2.5	3
68G	2	2	1.1	2
68H	2	1	0.5	1
68K	1	0	0.4	1
35(5)	8	7	2.1	3

CLASS II SUPPLY PERSONNEL REQUIREMENTS-REDUCED ACFT-ATTCK

UNIT TYPE	STOCKAGE LEVEL	LINES/ LEVEL	NO OF REQ	NO. DAYS	TOTAL REQ	SUM OF REQ	SUM OF LINES	REQ/LINE /DAY	WORK LOAD	PARTS REQ FLT LINE	PARTS REQ HSC	TOTAL PARTS	NO PARTS	REQ BY MANCAP	REQ/ DAY	MANPOWER REQ
AT PLL																
ATTACK	1.00	44.00	1.00	180.00	44.00											
	2.00	23.00	18.00	180.00	414.00											
	3.00	11.00	30.00	180.00	330.00											
	4.00	5.00	42.00	180.00	210.00											
	5.00	1.00	53.00	180.00	53.00											
	9.00	3.00	100.00	180.00	300.00	1351.00	87.00	0.09	37.53	111.00	120.00	1073.00	645.00	231.00	6.42	0.17
UTILITY	1.00	56.00	1.00	180.00	56.00											
	2.00	5.00	18.00	180.00	90.00											
	3.00	1.00	30.00	180.00	30.00											
	4.00	2.00	42.00	180.00	84.00	260.00	64.00	0.02	9.82	19.00	0.00	223.00	122.00	19.00	0.53	0.05
RECON	1.00	60.00	1.00	180.00	60.00											
	2.00	14.00	18.00	180.00	252.00											
	3.00	6.00	30.00	180.00	180.00											
	4.00	1.00	42.00	180.00	42.00											
	6.00	1.00	65.00	180.00	65.00											
	7.00	2.00	77.00	180.00	154.00	753.00	84.00	0.05	21.66	71.00	19.00	659.00	378.00	90.00	2.50	0.12
AT ASL																
	1.00	53.00	3.00	360.00	159.00											
	2.00	29.00	13.00	360.00	377.00											
	3.00	6.00	24.00	360.00	144.00											
	4.00	6.00	25.00	360.00	150.00											
ATTACK	6.00	4.00	37.00	360.00	148.00	978.00	98.00	0.03	12.06					428.00	11.89	0.99
UTILITY														101.00	2.81	0.23
RECON														281.00	7.81	0.65

TOTAL MANPOWER REQUIRED
AT DISCOM = 1.87

PERSONNEL REQUIREMENTS-PILOTS-REDUCTION IN AIRCRAFT

UNIT TYPE	AVG LAUNCH	AVG MSSN	MAX HRS PILOT	MSSN/ DAY/CO	PILOTS REQD
ATTACK	6.54	2.70	5.28	2.67	10.70

APPENDIX E
GLOSSARY

ACFT	Aircraft
AHB	Attack Helicopter Battalion
AHC	Attack Helicopter Company
ALDT	Administrative Logistics Down Time
AMC	Aviation Maintenance Company
AOE	Army of Excellence
ASL	Authorized Stockage List
ARS	Air Reconnaissance Squadron
ART	Air Reconnaissance Troop
ATP	Ammunition Transfer Point
CAB	Combat Aviation Brigade
COSCOM	Corps Support Command
DISCOM	Division Support Command
ECA	Early Comparability Analyses
EMA	Essential Maintenance Action
FARE	Forward Area Refueling Equipment
FARP	Forward Arming & Refueling Point
FH	Flying Hour
FIFO	First In - First Out
FSC	Forward Supply Company
FSD	Full Scale Development
HARDMAN	Hardware vs. Manpower
HEMTT	Heavy Expanded Mobility Tactical Truck
HHC	Headquarters & Headquarters Company
HHT	Headquarters & Headquarters Troop
HSC	Headquaters & Service Company
ILS	Integrated Logistics Support
LHX	Light Helicopter Experimental
LID	Light Infantry Division
LSA	Logistics Support Analysis
MACRIT	Manpower Authorization Criteria
MANCAP	Manpower and Mission Capability
MANPRINT	Manpower & Personnel Integration
MARC	Manpower Authorization & Requirements Criteria
MAXFLY	Maximum Fly-Off Test
MMH	Maintenance Man-Hours
MOS	Military Occupational Specialty
MPT	Manpower, Personnel, & Training
MSSN	Mission
MTBEMA	Mean Time Between Essential Maintenance Action
MTBMAF	Mean Time Between Mission Affecting Failure
MTTR	Mean Time to Repair
PLL	Prescribed Load List
PM	Program Manager
POL	Petroleum, Oils, & Lubricants
RAM	Reliabilty, Availability and Maintainability
RFP	Request for Proposal
S&T BN	Supply & Transportation Battalion
SCAT	Scout/Attack (Helicopter)

SESAME	Selected Essential-Item Stockage for Availability Method
TI	Technical Inspector
TOE	Table of Organization & Equipment
TQQPRI	Tentative Qualitative & Quantitative Personnel Requirements Information
UTIL	Utility